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 AN EVALUATION OF THE BIRD/AIRCRAFT STRIKE HAZARD AT SELECTED PA--ETC(U)  
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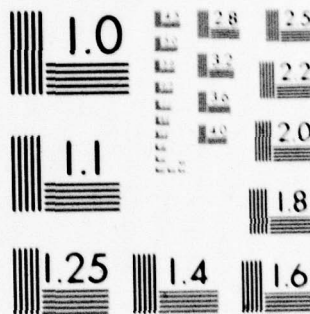
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**AN EVALUATION OF THE BIRD/AIRCRAFT  
STRIKE HAZARD AT SELECTED PACIFIC  
AIR FORCE (PACAF) INSTALLATIONS:**

OSAN AIR BASE, KOREA  
KUNSAN AIR BASE, KOREA  
TAEGU AIR BASE, KOREA  
KADENA AIR BASE, OKINAWA  
CLARK AIR BASE, PHILIPPINES

JEFFREY J. SHORT, CAPT, USAF  
JAMES S. KENT, 1 LT, USAF  
WILLIAM H. NIEMEIER, SRA, USAF

SEPTEMBER, 1979

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## PREFACE

This study was performed under Program Element 91212 F, AFESC JON 00DEVN 11. Inclusive dates of the study were 9-26 May 1979.

This report has been reviewed by the Public Affairs Office and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This memorandum has been reviewed and is approved for publication.

*Jeffrey J. Short*

JEFFREY J. SHORT, Capt, USAF  
BASH Reduction Team Leader

*William M. Kornman*

WILLIAM M. KORNMAN, GS-14  
Chief, Natural Resources  
Division

*Sterling E. Schultz*  
STERLING E. SCHULTZ, Colonel, USAF  
Director, Environmental Planning

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## SUMMARY OF OBSERVATIONS AND RECOMMENDATIONS

The following is a summary of observations and recommendations to reduce the bird/aircraft strike hazards (BASH) at Osan AB and Kunsan AB, Korea. An Executive Summary assisted the bases in the interim period until a more detailed staff assistance report could be provided.

1. Observation: The flight safety offices at Kunsan AB and Osan AB have provided excellent and timely guidance concerning bird avoidance for their respective bases. Air crews and air traffic control personnel report extensive bird movements and concentrations that may present a hazard to flight. However, no written plan for bird hazard reduction exists. AFR 127-15 requires all installations to implement a coordinated BASH plan.

Recommendation: Continue the present program, but prepare a written Bird Hazard Reduction Plan to insure continuity as personnel rotate. A Bird Hazard Working Group (BHWG) should be formed to develop the plan. It should be coordinated with all organizations concerned with implementation. The BHWG should include representatives from Flight Safety, Civil Engineering, Airfield Management, and Flight Facilities and can function as an agenda item at the Air Traffic Control Board. The plan should address environmental management of the airdrome and operational considerations in the local flying regime.

2. Observation: During fall migration, large numbers of birds pass through the region. Flocks of swallows loaf on the runways and taxiways at Kunsan AB and Osan AB and feed on insects early in the morning and late afternoon.

Recommendation: When birds congregate in large numbers around the airdrome, active control techniques may be required to scare them away before takeoffs or landings. Pyrotechnics are available for this purpose through Air Force supply channels.

3. Observation: A hunt is conducted to reduce the base pheasant population at both Kunsan AB and Osan AB.

Recommendation: Continue the hunt but extend the season as compatible with Korean laws. If possible, expand the season to shoot pheasants in the spring before they nest. If any bird species becomes a serious problem, a depredation permit could be obtained through the Korean Department of the Interior.

4. Observation: Certain areas of both airfields are poorly drained, have standing water and cannot be properly mowed. Several types of amphibians and fish live in the water providing food for wading birds such as herons. Ducks also use the water for loafing. Drainage ditches are clogged with dirt and decaying vegetation.

Recommendation: Improve drainage by removing debris from culverts, by re-ditching, or by filling where necessary. Removal of standing water will also serve to reduce insects on the airfield.

5. Observation: The location and extent of various rookeries (breeding aggregations of herons and egrets) and wintering sites for waterfowl in Korea are well-known.

Recommendation: Map the location of these concentrations of birds for distribution to the various flying organizations for use in planning and scheduling low-level routes. Large bird concentrations should be avoided to the maximum extent possible; these locations should be overflown no lower than 2,000 feet AGL. Correspondence should be initiated with Dr Pyong Oh Won, Kyung Hee University, to receive the latest information concerning bird concentrations and movements in Korea.

6. Observation: The Wing Safety Offices for the respective bases provide information to keep aircrews current on bird strike hazards. This information is distributed at the squadron level.

Recommendation: Continue a program of bird hazard warning. Bird migration routes and known bird concentrations can be plotted on flight maps. An accurate log of bird strike locations, whether damaging or not, can help develop trends and identify areas to avoid.

7. Observation: Airfield grass height management is an effective tool for bird hazard reduction.

Recommendation: The airfields should be managed to allow mowing over their entirety. Rocks should be removed and drainage improved. Grass heights of 6 to 12 inches (15 to 30 centimeters) should be maintained.



## SECTION I

### INTRODUCTION

The Bird/Aircraft Strike Hazard (BASH) Team visited Korea from 9 May through 22 May 1979 at the request of HQ PACAF. Our purpose was to evaluate bird strike hazards to aircraft at Osan AB and Kunsan AB. Taegu AB was also visited since an USAF Unit (497TFW) operates from there. The USAF bird strikes in the Pacific Theater were more numerous in 1979 than in previous years. Assistance was also requested by personnel at Kadena AB, Okinawa and Clark AB, Philippines to evaluate their BASH reduction programs. These installations were visited from 23-26 May 1979.

Our recommendations will help individual bases implement bird hazard reduction programs. These recommendations provide a program to define responsibility and authority for bird hazard reduction, information to train and equip bird control personnel, habitat modifications to reduce the attractiveness of airfields to birds, a system to warn pilots about high bird strike risks in specific areas, and methods of reducing pest bird problems in storage buildings and hangars. The report applies to all installations visited, unless specifically addressing a particular base.

No program will totally eliminate the possibility of a bird strike. Birds will continue to use airfields, and migrating flocks will always occupy airspace used by our aircraft. However, most bird strikes occur at low altitudes, often in areas where we can exercise control. A safer flying environment will result from a comprehensive program to reduce bird strike hazards. This program requires the allocation of funds and manpower. People who operate the program must be dedicated, responsible and knowledgeable. Good communication and coordination are essential. underlying keys are an active awareness and a genuine concern for the reduction of bird/aircraft strike hazards.

## SECTION II

### DESCRIPTION OF BIRD HAZARDS AND PROBLEMS

Large numbers of birds fly through the Korean peninsula during spring and fall migrations (Figure 1). These birds usually follow the coastlines although soaring birds, such as hawks, may follow mountain chains because of the updrafts the topography provides. Once breeding begins, several areas may develop large concentrations of birds. These areas are usually near the coastlines and are associated with an ample food supply and available nesting habitat. The same problem exists in the Philippine Islands which has one of the most diverse bird populations in the world. Okinawa has few birds because of its relatively small size and its isolation from the mainland and larger islands.

Most bird strikes occurred in Korea during the landing phase and on low-level exercises in the Philippines. While several species of birds were sighted on the airfields, no particularly hazardous concentrations or movements were noted. Pheasants (Phasianus colchicus) are a potential BASH problem at the Korean bases, while flocks of Pratincoles (Glareola maldivarum) presented the biggest hazards at Kadena AB and Clark AB. Large numbers of House Swallows (Hirundo rustica) congregate at Osan AB and Kunsan AB in late summer. Appendix A lists bird species observed on Air Force installations during this survey.

Low level flights expose aircraft to bird hazards where no control of birds by the base is possible. Because of the high speeds at low altitudes, mishaps during this phase of flight are particularly dangerous. Overall, the F-4 Phantom aircraft withstands bird strikes well, but other jet aircraft may be more susceptible. As new weapon systems (F-15, F-16) are introduced within PACAF, it will be necessary to identify those regions where birds will conflict with aircraft operations. The airspace over Korea is already severely restricted and there is little room for modification of the low-level routes, instrument approaches or traffic patterns that are now flown. It is important to implement operational safety measures to avoid bird concentrations by the widest possible margins.

The most serious problem noted was a lack of continuity in any formal program. All units visited were concerned about bird strikes and had published guidance on the nature of the problem around their respective bases. However, most units lacked coordination necessary to develop an effective BASH reduction program using base resources with those from the local community.



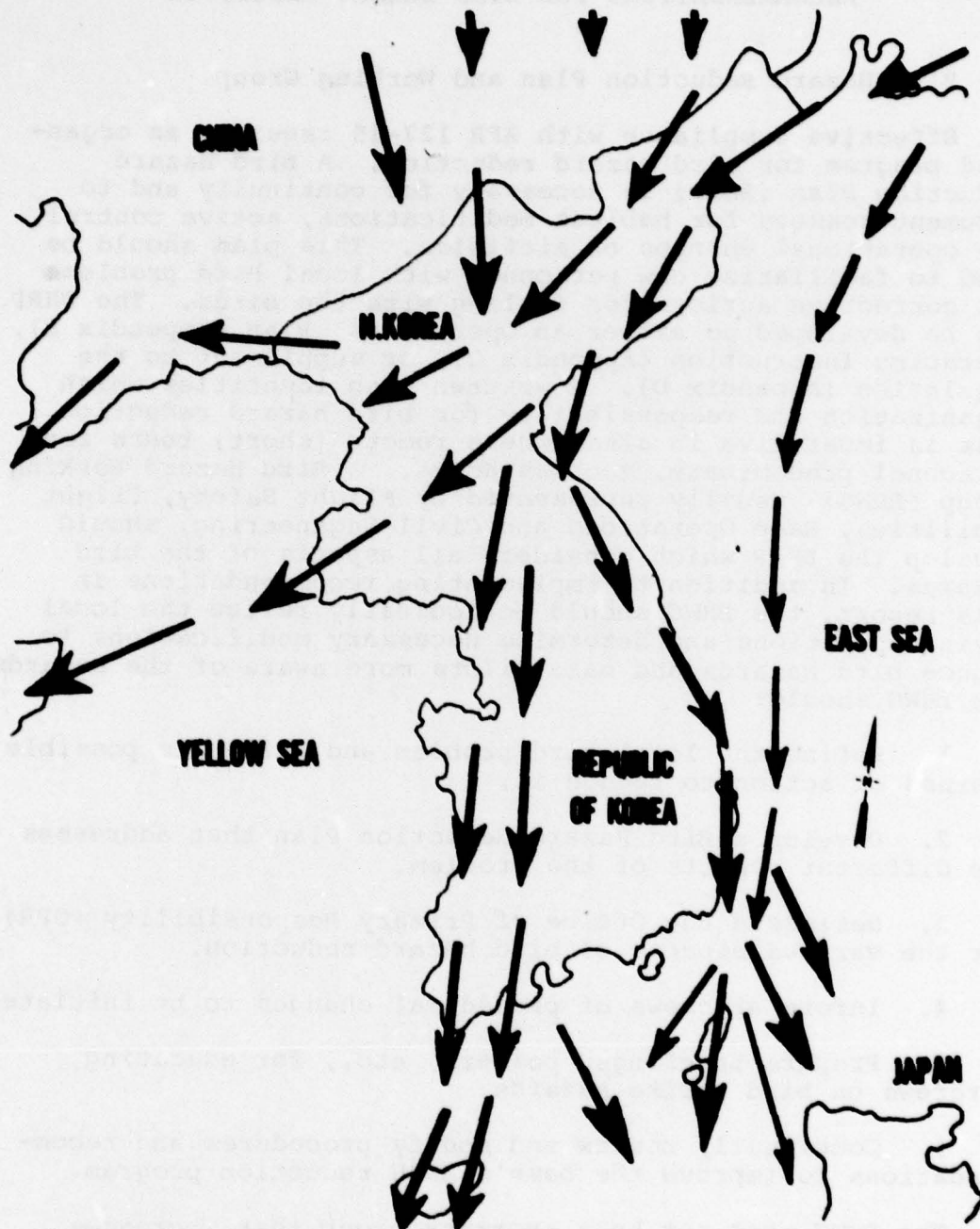


FIGURE 1  
KOREAN BIRD MIGRATION PATTERNS

### SECTION III

#### RECOMMENDATIONS FOR BIRD HAZARD REDUCTION

##### A. Bird Hazard Reduction Plan and Working Group

Effective compliance with AFR 127-15 requires an organized program for bird hazard reduction. A Bird Hazard Reduction Plan (BHRP) is necessary for continuity and to document reasons for habitat modifications, active control and operational changes on airfields. This plan should be used to familiarize new personnel with local bird problems and corrective actions for dealing with the birds. The BHRP can be developed as either an Operations Plan (Appendix B), Operating Instruction (Appendix C), or supplement to the regulation (Appendix D). A written plan identifies which organization has responsibility for bird hazard reduction. This is imperative in areas where remote (short) tours for personnel predominate, such as Korea. A Bird Hazard Working Group (BHWG), usually represented by Flight Safety, Flight Facilities, Base Operations and Civil Engineering, should develop the BHRP which considers all aspects of the bird hazards. In addition to implementing recommendations in this report, the BHWG should periodically review the local flying operations and determine necessary modifications to reduce bird hazards and make pilots more aware of the hazards. The BHWG should:

1. Define the local bird problem and delineate possible courses of action to reduce it.
2. Develop a Bird Hazard Reduction Plan that addresses the different aspects of the problem.
3. Designate the Office of Primary Responsibility (OPR) for the various aspects of bird hazard reduction.
4. Inform aircrews of procedural changes to be initiated.
5. Prepare briefings, posters, etc., for educating aircrews on bird strike hazards.
6. Continually review and modify procedures and recommendations to improve the base's BASH reduction program.

The BHWG need not be a separate group that increases workloads with meetings and reports. Ideally, the BHWG should be a subcommittee of an existing group such as the Air Traffic Control Board or the Integrated Safety Council. The BASH problem can be treated as an open agenda item, with the

BHWG resolving problems concerning implementation of these recommendations in addition to developing and overseeing the BASH program for the base. The BHWG acts as the primary contact between the base and other organizations regarding bird hazard reduction.

#### B. Habitat Modification

The most effective way to reduce bird populations around airfields is to eliminate conditions which attract them. Birds use airfields to find food, safe rest or breeding areas. If these attractants are eliminated, bird populations will be reduced and hazards lessened. Habitat changes normally do not bring about rapid results, and only a long range program will be effective. These techniques require planning, coordination, and expenditure of funds, but are the best overall bird reduction measures.

Easy access to food on and near airfields is a strong bird attractant. Extensive rice cultivation around the Korean bases provides an abundant food supply for many different types of birds. The airfield environment should be as unattractive as possible to birds. Centipedes (Class Chilopoda), frogs (Rana sp.), and small carp (Cyprinus carpio) were found on the airfield at Osan AB. Evidence of small rodents was found in owl pellets near the airfield at Kunsan AB. Although these food sources did not attract large numbers of birds, they were substantial enough to draw some birds from the surrounding countryside, and they should be managed. These attractants can be eliminated with better drainage, insecticide applications and rodent control.

Controlling grass height is one of the most effective techniques for reducing airfield attractiveness to birds. Flocking birds, such as Whimbrels (Numenius phaeopus) at Kunsan AB or Pratincoles at Kadena AB and Clark AB, use airfields as secure areas to loaf and feed. Short grass allows birds to see each other to maintain flock integrity and to see predators at a great distance. Short grass also makes feeding easier as invertebrates are exposed and readily available to the birds. Long grass obstructs the birds' vision making them less secure and making food more difficult to find. Statistically, long grass not only reduces the number of birds by about half but also reduces the frequency of occurrence. However, grass that is allowed to grow too long will provide shelter for Pheasants and attract predatory birds to rodents that live in the grass. Usually, a length of 6-12 inches (15-30 cm) is a good compromise length; but some trial and error may be necessary where grass grows extremely fast such as the Philippines. The grass growing on Korean airfields is adequate to support the suggested grass height.



Standing water is especially attractive to waterfowl and other birds because the surrounding vegetation is often allowed to grow uncontrolled. After heavy rains, portions of the airfield with standing water should be marked. Later, these low areas can be filled, leveled and reseeded with the predominant airfield grass. Drainage channels should be reditched to improve run-off and banks sloped to allow easy grass mowing. Figures 2 and 3 depict the dominant drainage patterns on Osan and Kunsan airfields. Pheasants were observed using the tall grass in the marshy area at Osan AB and Spot-billed Ducks (Anas poecilorhyncha) were feeding and loafing on small ponds at Kunsan AB.

### C. Active Bird Control

Despite changes to the airfield, birds will continue to use the airdrome environment. Active bird control is needed for short-term solutions to bird hazards. Birds move quickly and unpredictably and even when situated in a relatively "safe" portion of the airfield, they can become a hazard at any time. The birds may also act as decoys, attracting others. For these reasons, all bird flocks should be dispersed after they come to the airfield. Birds are persistent and require constant harassment to discourage their use of the airfield. Coordination with the Control Tower is required before any birds are dispersed from the airfield. This will insure that birds are not scared into the path of aircraft. A variety of equipment has been authorized for active bird control in Table of Allowances 483 (Appendix E). Scaring birds will require a vehicle, radio communication with the Control Tower, bioacoustics equipment, and pyrotechnics.

Responsibilities for active bird control must be delegated by the BHWG. At most bases, bird control is under the authority of Airfield Management with Base Operations personnel providing most of the manpower. Personnel from Security Police, Pest Management and the Fire Department may also be used as the situation dictates.

A vehicle must be made available for bird dispersal. Because driving off paved surfaces may be required, four-wheel-drive is essential; open tread tires will prevent foreign objects from adhering to the wheels. When pyrotechnics are used, a sign, "Class B Explosives" (Department of Transportation SF432) must be displayed on all four sides of the vehicle during their transport from munitions storage to the airfield. Two fire extinguishers are required in the vehicle by AFR 127-100 when transporting pyrotechnics.

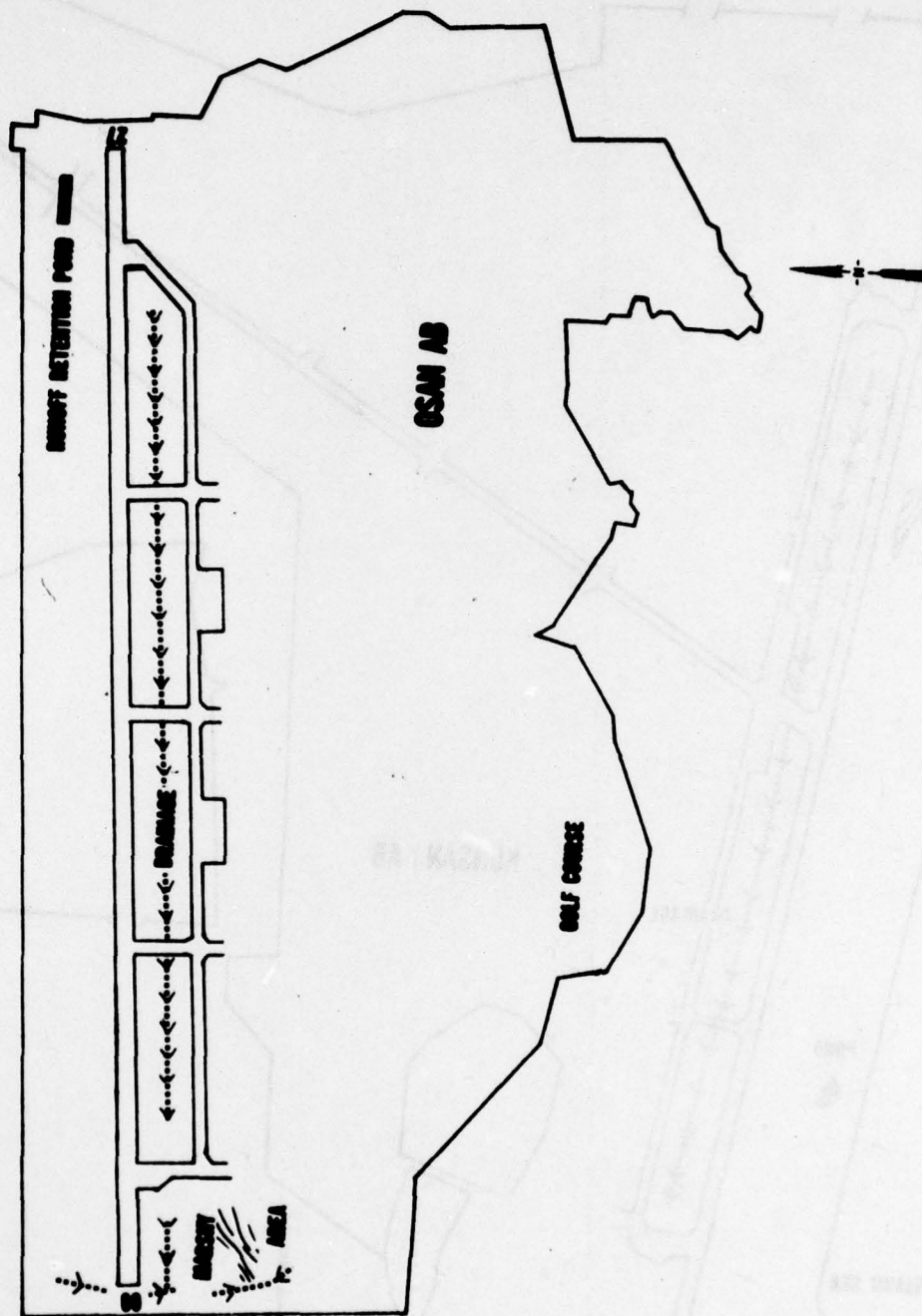


FIGURE 2  
OSAN AIR BASE, KOREA

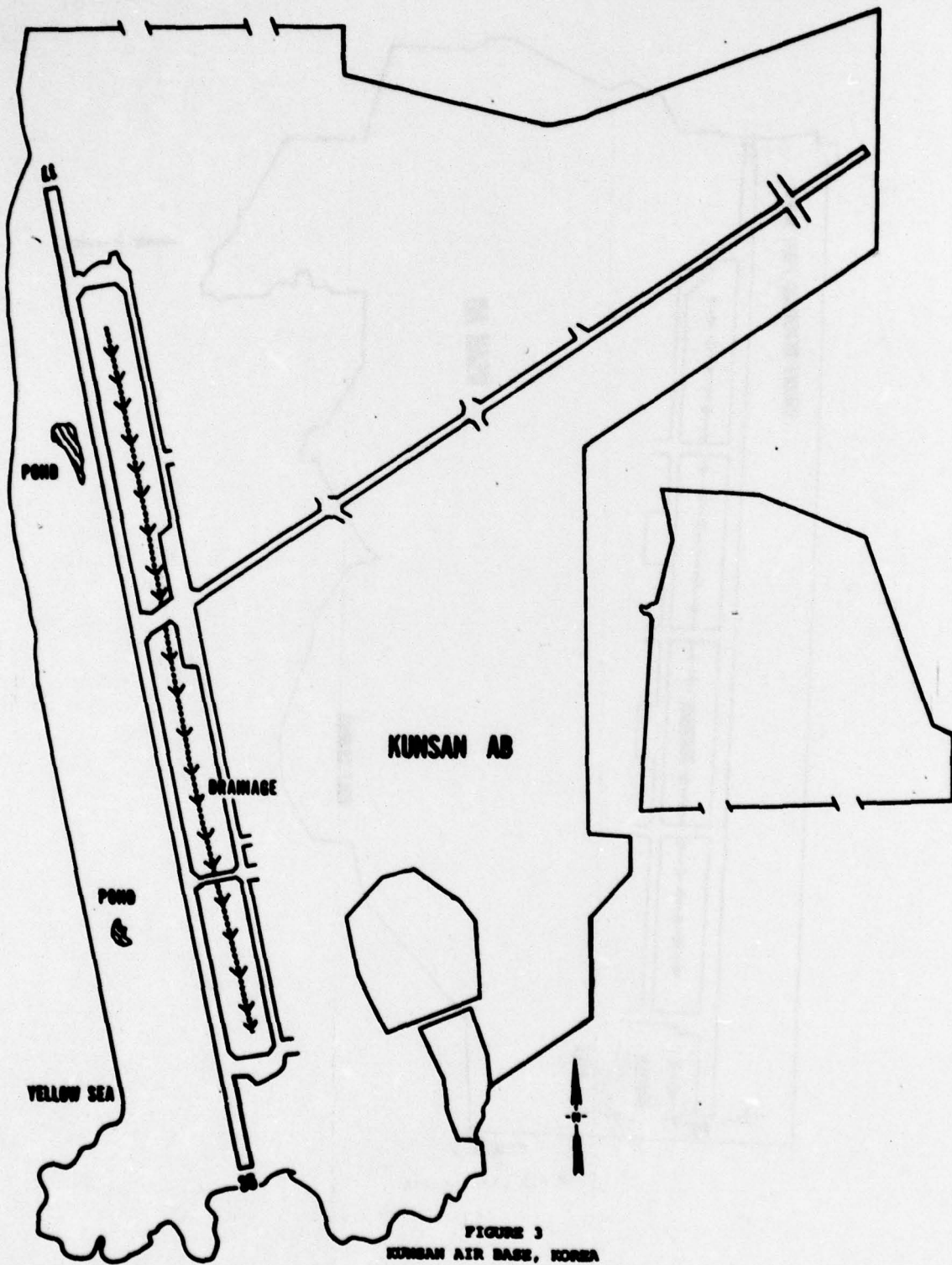


FIGURE 3  
KUNSAN AIR BASE, KOREA



Bioacoustics are a bird control system using recordings of distress calls emitted by birds under stress. A speaker is mounted on a vehicle containing sound equipment capable of producing 30 to 50 watts of distortion-free sound in 90 to 110 dB with a frequency response of 14,000 HZ. In operation, the vehicle is driven 100 to 150 meters upwind of the birds and stopped with the speaker pointed toward the birds. The operator identifies the bird species and selects the appropriate tape. Proper identification is important because distress calls are specific for each species, i.e., what is effective on Pratincoles will not work for Whimbrels. The distress calls are played for 15 to 20 seconds and shut off. If the birds have not moved within 20 seconds, a second playing of the same duration should be used. If the birds have not moved by the third attempt, it is unlikely that they can be moved with this method. Do not allow the tape to play indefinitely. Birds may become habituated, and the calls will be ineffective. When birds react to distress calls, they frequently fly toward the vehicle to investigate the "injured" bird. At this time pyrotechnics may be used to hasten the birds' dispersal and control their direction of flight. Using pyrotechnics earlier may confuse birds and cause them to remain near the airfields longer. Distress tapes require some time to remove birds, and this method is the most useful during breaks in flying and before flying operations begin each day. Some birds do not emit distress sounds that will disperse flocks. Currently, there are no bird distress tapes available for the bird species in the PACAF region. The BASH Team is working on a contract which can provide distress tapes for species. Tapes will be available from the BASH Team in the future.

Pyrotechnics are noise producing devices which are extremely effective for scaring birds. They include M-74 simulator airbursts, 12 gauge scare cartridges, and gas cannons. The pyrotechnics presently approved for permanent use by the Air Force are gas cannons and airbursts. The Pest Management section at Osan AB has several gas cannons in good working order. The M-74 airburst is fired from the M-1 flare pistol and the scare cartridges are fired from a single shot, breakopen, 12 gauge shotgun. These explosive projectiles travel about 100 meters before a secondary explosion occurs. To be most effective, airbursts should be exploded above flocks on the ground on the side opposite the desired direction of the birds' departure. Ear protectors, gloves and goggles are required when using pyrotechnic device. Pyrotechnics must never be fired towards aircraft, and Security Police and Control Tower personnel must be contacted before their use. Pyrotechnics training is necessary for each person involved in scaring birds. Such training is provided by the NCOIC for Small Arms. A sample of the

Safety Operating Instructions for handling pyrotechnics is provided in this report (Appendix F). This sample must be modified for use by individual bases.

To keep birds from becoming accustomed to scaring techniques, it may be necessary to reinforce the response by killing an occasional bird. With the bird control equipment available, killing should be minimal. A depredation permit is required before taking any species on air bases. Certain bird species are protected by law and any active control measure MUST be coordinated through the respective government agencies. Pheasants are hunted on Korean Air Bases according to local laws. This is an excellent way to control the population on base, but grass height management is important to reduce the overall attractiveness of the airfield. Pheasants on the bases will be better controlled if a spring hunt is conducted each year to reduce the number of breeding birds. Both hens and roosters should be taken.

#### D. Flight Operation Changes to Reduce Bird Strikes

When environmental modifications and active control measures do not satisfactorily reduce bird hazards on the airfield, options must be considered for modifying flying operations to reduce the risk of bird strikes. These operational changes will be dictated by the severity of the problem, the performance capability of the aircraft, and training or readiness requirements. Bird hazards are like any other safety hazard which must be assessed with respect to operational requirements. Clearly, during contingency operations or advanced stages of readiness, bird hazards have minimal safety priority. However, during training to maintain operational readiness, certain changes can be made to improve safety and reduce costly repairs. For instance, the 497 TFS because of possible engine problems use a self-imposed limit of 2,000 feet AGL for training. This unit has experienced the least number of bird strikes.

The BASH Team cannot provide all the possible changes which could be made in unit operations to reduce bird hazards. A knowledge of unit operational and training requirements, combined with an understanding of local flying restrictions, is required to evaluate possible modifications to local procedures.

The BHWG forms the foundation for developing a bird avoidance program. The following recommendations will aid in reducing bird hazards through modification of operational procedures. Many of the recommendations will apply to bird hazard reduction at any base.



1. Mission Aborts Due to Bird Strikes. Abort a takeoff or planned touch-and-go if a bird strike occurs and sufficient runway remains to stop. Bird strike damage cannot be accurately assessed inflight and may result in a complex airborne emergency. Damage assessments can only be made by maintenance personnel on the ground. Several bird strikes which appeared to cause minor damage have proven to be much more substantial and, had the pilots continued the mission, a serious emergency would have resulted. Structural damage, such as a dent in the wing, has led to fuel and hydraulic system failures.

2. Takeoff Procedures. Aircraft making formation departures, such as the F-4 increase the risk of damaging bird strikes when birds are feeding or loafing on and near the runway. This situation can be avoided by making single-ship departures and by using active control to scare off the birds before formation departures. Wing and interval takeoffs with the wingman taking six to ten second spacing often result in birds being scared up by the lead aircraft. The wingman then hits the birds. Pilots of lead aircraft must be alert and warn wingmen of bird hazards during takeoff roll. This is especially important for wing takeoffs where all the wingman's concentration is on his leader and he is unaware of the size of the bird hit or its impact location. If large flocks of birds are scared up by the lead aircraft, the wingmen may want to delay their departure until the birds are clear of the runway. Wingmen can abort the formation takeoff if flocks of birds pose a hazard.

3. Migratory Bird Problems. When flocks of migratory birds are a problem, aircraft formation departures involving rejoins after takeoff increase the risk of serious bird strikes. Turning and straight-ahead rejoins require greater attention by pilots to the lead aircraft's position. Pilots cannot adequately clear for birds while simultaneously attempting to join on lead's wing. The increased speed necessary to overtake the lead aircraft after takeoff further increases the risk of damaging bird strikes. When birds are known to be flying in the area, departures under visual meteorological conditions may require modification to reduce the risks. Departures should be made in trail, with the rejoin beginning after the aircraft pass 2,000 to 3,000 feet AGL. If aircraft are to immediately enter a low level route or stay at an intermediate altitude for a prolonged period of time, a tactical formation is providing sufficient aircraft clearance to allow wingmen to clear for birds. Where weather is a factor, wing takeoffs are preferred, realizing that many bird strikes occur just before entering a low overcast or immediately above an undercast sky condition.

4. Enroute Bird Strikes. Aircrews experiencing enroute bird strikes should abort the mission, and land as soon as possible. While an engine ingestion or a canopy strike may be readily apparent from the cockpit, many fuselage, wing, tail or radome strikes cannot be adequately assessed for damage. Continuing a mission may result in greater structural damage and an emergency situation later in the flight.

5. Checklist Procedures and Pre-briefings. When flying low-level routes higher aircraft speed and greater exposure within the bird's flight environment have led to many damaging and injurious bird strikes. Many of these strikes occur at low level and bombing range entry points. Pilots and weapons systems operators are then involved in cockpit duties which cause crewmembers to reduce their eye contact outside of the cockpit. Emphasize "heads-up" flying during these critical transitions. Checklist items should be accomplished in such a manner as to allow for maximum eye contact outside of the cockpit. Briefings of bird strike emergency procedures before each flight may save an airplane and its crew. An inflight bird strike is much like a takeoff emergency where urgency dictates a pre-planned course of action. As a minimum, pilots should brief (or be briefed on) the following:

- (1) Wear the double helmet visor down during daylight hours, the clear visor at night or during low level operations.
- (2) Lost cockpit communications.
- (3) Positive change in aircraft control between pilot and copilot.
- (4) If flocks of birds are encountered, initiate a climb since most flocks are distributed in a downward direction in the air space.
- (5) Evasive maneuvers at low altitude.
- (6) The need and procedures for a controllability check in the event of a damaged airframe.
- (7) Engine failure procedures if birds are ingested.
- (8) Aircraft recovery procedures and routes of flight to return to base with a minimum of cockpit communication.
- (9) Locking of shoulder harnesses of injured crewmembers to prevent falling forward onto flight controls.



(10) Crew egress procedures in the event that control cannot be maintained.

(11) Preflight safety briefings including mapped information about potential bird problems along their route of flight.

The aircrew's ability to react to a bird strike situation is further enhanced by periodically reviewing bird strike procedures during continuation training and safety meetings.

6. Inform Transient Aircrews of Local Bird Hazards. Transient crews are often unfamiliar with airfield hazards, including birds. This conclusion is supported by the facts that many bird strikes happen away from the home base and at some bases the most damaging bird strike incidents happen to transient aircraft. Information in the "Remarks" section of the FLIP IFR Enroute Supplement, use of Notices to Airmen (NOTAMS), and broadcasting information on either Automatic Terminal Information Service (ATIS) or on initial radio contact can aid in informing the aircrew of potential bird hazards. Remarks in the IFR Enroute Supplement can explain procedures for BIRD WATCH (defined later in this report), NOTAMS can identify problems of long duration (migration, bird roosts, heavy feeding on the airfield, control measures being used, etc.), and broadcasts on ATIS and from the Tower can provide information of an immediate nature.

7. Pilot Responsibility. Pilots must help detect birds on the airfield and in the local flying vicinity. When pilots sight birds they should notify other pilots and the Control Tower so others can be informed of the hazard. Pilots will also help Tower personnel become aware of bird hazards by requesting bird hazard information before takeoff or landing. These requests will remind Air Traffic Controllers to inspect for birds before authorizing aircraft movement.

8. Bird Hazard Identification. Bird concentrations both in the local area and in regions where low-level sorties are flown should be tracked, and pilots should be briefed on the potential hazards they may face on a particular mission.

The Korean airspace is divided into three zones (Figure 4). Low-level flights are conducted IAW AFKR 51-1 which places the aircraft from 500-2,000 feet AGL in Zones 1 and 2 and as low as 100 feet AGL in Zone 3. RF-4 aircraft and crews from Kadena AB, C-130 aircraft from Clark AB as well as ROKAF aircraft jointly use the same route structure. There is a high probability of a disastrous bird strike in this high-speed, low-altitude flight regime unless proper consideration is given to avoiding hazardous bird concentrations. Many of the locations of large bird populations have

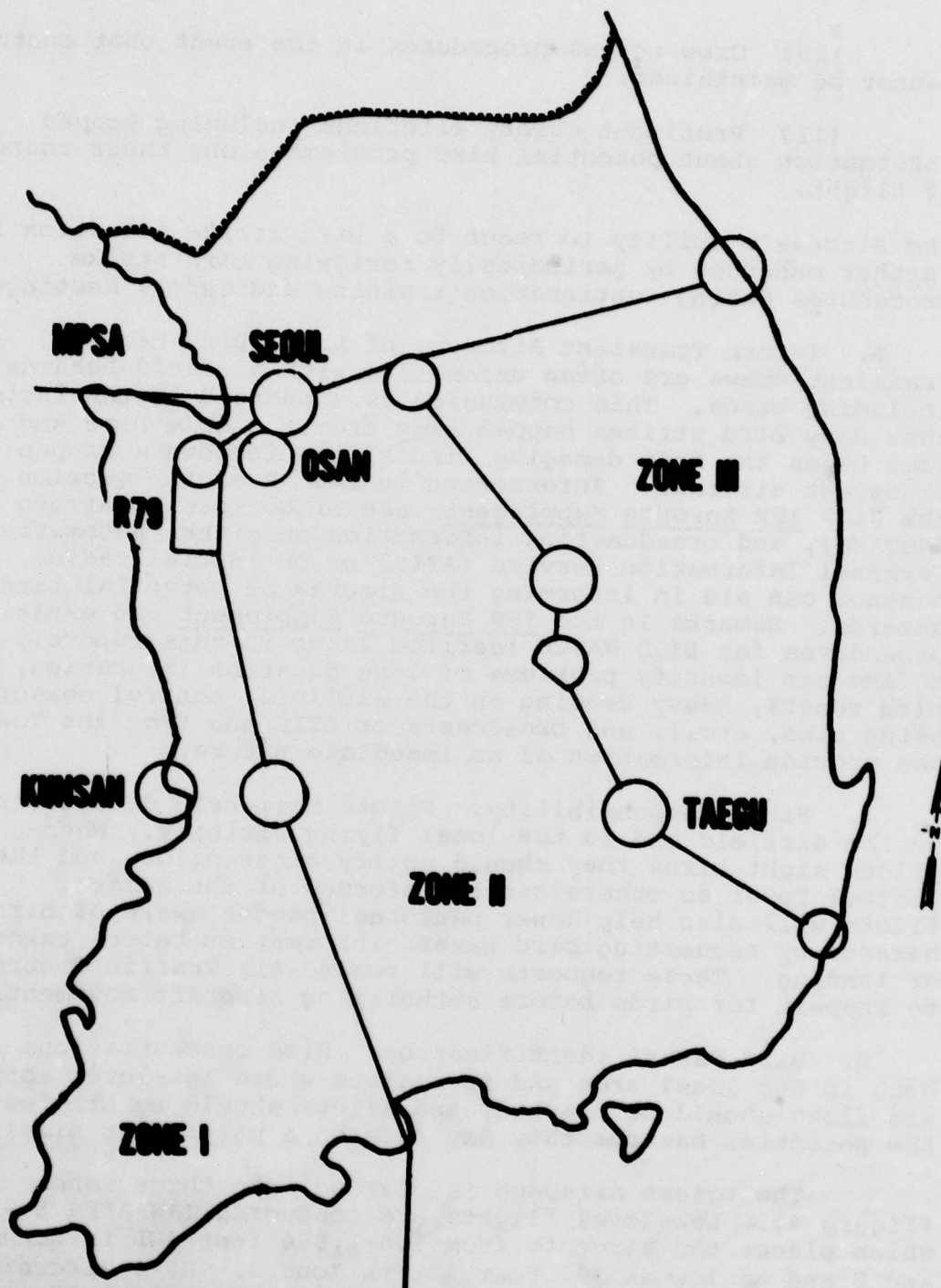


FIGURE 4  
KOREAN AIRSPACE ZONING

been designated as Korean national monuments (Appendix G) so their exact position is readily available to schedulers and planners. Similar information exists regarding Philippine and Japanese wildlife. These areas should be avoided when the birds are at their peak. Aircraft should not overfly these areas at less than 2,000 feet AGL. In addition, coastlines should not be followed, especially during migration.

To assist in informing pilots of bird activities in the local area which require operational changes, the term BIRD WATCH should be used. Similar to a MET WATCH for severe weather, BIRD WATCH alerts aircrews to possible flight hazards due to increased bird activity. BIRD WATCH conditions should be incremental to reflect varying degrees of bird hazards. For example, BIRD WATCH RED would exist when House Swallows loaf on the hardstands of the airfield, BIRD WATCH YELLOW could signify Whimbrels feeding near runways, and BIRD WATCH GREEN would indicate no unusual bird activity in the airdrome. Operational changes for each BIRD WATCH condition would be defined by the BHWG. BIRD WATCH could be declared by the Chief Controller, Supervisor of Flying or Air Traffic Control personnel. Pilots flying in the local area should be encouraged to use BIRD WATCH terminology to inform other pilots about bird hazards in the traffic pattern. A BIRD WATCH alert is particularly useful to inform transient aircrews.

#### E. Pest Bird Reduction

Pest birds inhabit hangars and storage buildings at Clark AB and Kadena AB. Their droppings are caustic to metal, contaminate sensitive aircraft systems and result in many wasted man-hours involved in otherwise unnecessary cleanup. An unaesthetic, unsanitary working environment is also detrimental to the morale of hangar personnel.

To justify a pest bird control program, the number of man-hours used cleaning up bird droppings must be documented. Pest bird control must be justified on a cost-benefit basis or a recognized health hazard before any effective program can be initiated. Different methods can be used with varying degrees of success.

Several techniques for pest bird control in structures have been tried without success. Each method may be effective for a few days, but birds soon habituate, and the techniques become useless. Stuffed owls, rotating and flashing lights, rubber snakes and various sounds are examples of some ineffective techniques. Before any method is tried, the BASH team should be consulted.



The most effective and permanent solution to the pest bird problem is to exclude the birds from the building superstructure. It is not feasible to keep all doors to hangars closed, but two methods have been effective in keeping birds from roosting in large buildings. The most permanent solution to the problem is a plastic netting (Conwed Corporation plastic netting, OV1670 and OV1580, made in Minneapolis, Minnesota) used to establish a barrier to the hangar superstructures and deny birds access to roosting perches. Conwed netting meets Air Force fire protection standards and sells for less than one cent per square foot plus installation costs. Several chemical repellents are also available which can be spread on the hangar superstructures. These chemicals resemble a sticky gel and give birds a chemical "hot foot" or make the site unsuitable for perching. One of the chemicals, Roost-No-More, has a National Stock Number, NSN 6840-559-1550. The BASH Team has conducted an evaluation of commercial bird repellents. The results of this study show that a proper application in a hangar-type structure is expensive and require reapplication every few years. However, repellents are a practical solution for limited areas.

A practical short-term solution to pest birds inside structures is a trapping program to be carried out by Pest Management personnel. Plans for trap construction are included in this report (Appendix H). Pigeons (Columba livia) often spend time on hangar roofs, making these locations ideal trapping areas. Before trapping, pre-bait with corn for at least two weeks. Every morning place fresh bait near traps, but not inside them. Remove excess grain not consumed each day. After the birds begin feeding heavily in the area, place corn and water inside the trap. Remove trapped birds early in the morning and late in the afternoon and add fresh bait and water. Remove any bait not consumed from the previous day. Leave one or two healthy birds in the trap each day to act as decoys. Continue the trapping program until there is no longer a significant number of birds being caught. Dispose of the birds as directed by the Base Veterinarian.

Pigeon numbers can be reduced by chasing the birds from the hangars and shooting them with shotguns as they fly out of the buildings. Number 6 bird shot should be used. This program creates safety problems, and considerable planning and coordination are necessary before using this method of bird control. Carried out over several days, shooting will reduce the bird numbers. Careful use of pellet guns to shoot birds inside hangars also effectively reduces bird numbers. This is not a permanent solution; new birds will replace those shot, and the population will grow back to its original size. Dispose of bird remains as directed by the Base Veterinarian or Environmental Health personnel.

At Kadena AB, Building 692 has a critical problem caused by House Swallows. The birds nest and roost on a sprinkler system that is suspended from the building roof and along the centerline of the building. Bird droppings cover the floor in the center of the building and along four separate water lines that cross the building. Extensive man-hours are required to clean the building each week. Environmental Health personnel on the base have expressed concern over sanitary conditions in the building. The most permanent solution would be the plastic netting discussed earlier. The hangar roof will not require complete enclosure, and only the sprinkler system and center of the building needs to be enclosed. If any eradication measures are planned, the Judge Advocate must be consulted to determine the legal status of House Swallows in Okinawa. Food poisons are not effective on House Swallows because they are insect feeders.

## SECTION IV

### SPECIAL CONSIDERATIONS

Much is presently unknown about Pacific bird species as they relate to hazards to aircraft. Fortunately foreign governments are interested in their natural resources and much can be learned about local bird habits through the respective universities and national departments of fish and game. Often these agencies can provide information on local techniques to prevent crop depredation by birds which sometimes parallel methods which would be effective on airfields.

A free exchange of information regarding BASH problems is important to the overall program. A ROKAF F-5 was lost at Kwang-ju AB during the late summer of 1978 to a multiple bird strike. This underscores the need for a joint BASH program or at least crosstell of BASH problems. This report should be distributed to ROKAF units so that they can initiate programs to increase their pilots' awareness of bird hazards. Most safety offices employ "nationals" who could interpret this report.

Appendix I lists contacts and addresses for those who can assist with bird remains identification, i.e., locate large roosting or nesting sites for birds, and provide information concerning bird movements and concentrations. Their expertise should be used to the fullest.

Equipment and methods described in this report are legal on USAF bases. Before any control program for hazardous or pest birds are initiated in a foreign country, government agencies must be contacted to be sure our actions are legal and acceptable. The Judge Advocate's office should be consulted before initiating a control and when any question or problem arises.



# APPENDIX A

## BIRD SPECIES OBSERVED

Common Name	Scientific Name
<u>Kunsan Air Base, Korea</u>	
Ring-necked Pheasant	<u>Phasianus colchicus</u>
Spot-billed Duck	<u>Anas poecilorhyncha</u>
Kestrel	<u>Falco tinnuculus</u>
Kentish Plover	<u>Charadrius alexandrinus</u>
Little Ringed Plover	<u>Charadrius dubius</u>
Black-tailed Godwit	<u>Limosa limosa</u>
Whimbrel	<u>Numenius phaeopus</u>
Greenshank	<u>Tringa nebularia</u>
Dunlin	<u>Erolia alpina</u>
Sanderling	<u>Crocethia alba</u>
Blue Rock Thrush	<u>Monticola solitarius</u>
Skylark	<u>Alauda arvensis</u>
<u>Osan Air Base, Korea</u>	
House Swallow	<u>Hirundo rustica</u>
Skylark	<u>Alauda arvensis</u>
Common Curlew	<u>Numenius arquata</u>
Pied Wagtail	<u>Montacilla alba</u>
Grey Heron	<u>Ardea cinerea</u>
Little Ringed Plover	<u>Charadrius dubius</u>
Eastern Golden Plover	<u>Charadrius dominica</u>
Ring-necked Pheasant	<u>Phasianus colchicus</u>
Pintail Duck	<u>Anas acuta</u>
Tree Sparrow	<u>Passer montanus</u>
Jackdaw	<u>Corvus monedula</u>
Magpie	<u>Pica pica</u>
Baikal Teal	<u>Anas formosa</u>
Grey-hooded Bunting	<u>Emberiza fucata</u>
Solitary Snipe	<u>Capilla solitaria</u>
<u>Taequ Air Base, Korea</u>	
Pied Wagtail	<u>Montacilla alba</u>
Russett Sparrow	<u>Passer rutilans</u>
Tree Sparrow	<u>Passer montanus</u>
Ring-necked Pheasant	<u>Phasianus colchicus</u>
Skylark	<u>Alauda arvensis</u>
Grey Starling	<u>Sturnus cineraceus</u>
Red-tailed Shrike	<u>Lanius cristatus</u>
Forest Wagtail	<u>Dendronanthus indicus</u>
Black-naped Oriole	<u>Oriolus chinensis</u>

# BIRD SPECIES OBSERVED - Continued

Common Name

Scientific Name

## Clark Air Base, Philippines

Giant Heron	<u>Ardea sumatrana</u>
Shrenck's Least Bittern	<u>Ixobrychus eurhythmus</u>
White-eye	<u>Zosterops sp.</u>
Chestnut Manakin	<u>Lonchura malacca</u>
Gray Swiftlet	<u>Collocalia vanikorensis</u>
Pratincole	<u>Glareola maldivarium</u>
Spotted Imperial Pigeon	<u>Ducula carola</u>
Philippine Falconet	<u>Michrohierax erythrogonyx</u>
Philippine Trogon	<u>Harpactes ardens</u>
Blue-tailed Beeater	<u>Merops philippinus</u>
Small Skylark	<u>Alauda gulgula</u>
Pied Chat	<u>Sasacula calsrata</u>
Gray-headed Fantail	<u>Cisticola exilis</u>
White-collared Kingfisher	<u>Halcyon chloris</u>
Crested Myna	<u>Acridotheres cristatellus</u>

## Kadena Air Base, Okinawa

Pratincoles	<u>Glareola maldivarium</u>
House Swallow	<u>Hirundo rustica</u>

**APPENDIX B**



**HEADQUARTERS**  
**56<sup>TH</sup> TACTICAL FIGHTER WING**  
**MACDILL AFB, FLORIDA**



56 TFW PLAN 127-15  
BIRD AIRCRAFT STRIKE HAZARD  
30 JULY 1978

DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 56TH TACTICAL FIGHTER WING (TACF)  
MACDILL AIR FORCE BASE FLORIDA 32008



REPLY TO  
ATTN: SE

SUBJECT: 56 TFW Plan 127-15 Bird Aircraft Strike Hazard

10 See Distribution (ANNEX 2)

1. Forwarded herewith is the 56 TFW Plan 127-15 which provides guidance for reducing the bird strike hazard in the areas where the 56 TFW conducts flying operations.
2. This plan is effective for planning on receipt and for execution when directed by this Headquarters.
3. This plan was coordinated with all tasked organizations.
4. Tasked organizations will develop necessary checklists for implementation. Supporting plans are not required.
5. This plan will be reviewed as of 30 July each year and updated as appropriate. Tasked organizations will review this plan 30 days prior to that date and forward comments to 56 TFW/SEF by 30 July.
6. The Office of Primary Responsibility (OPR) for this plan is the 56 TFW Office of Safety, this Headquarters.

  
CHARLES J. CUNNINGHAM, JR.  
Colonel, USAF  
Commander

HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

56 TFW PLAN 127-15

SECURITY INSTRUCTIONS/RECORD OF CHANGES/ANNUAL REVIEW

1. The long title of this plan is 56 Tactical Fighter Wing Bird Aircraft Strike Hazard Plan 127-15. The short title is 56 TFW BASH Plan.
2. The overall classification of this document is UNCLASSIFIED.
3. Reproduction of this document in whole or in part is prohibited except as required for preparation of supporting directives, operating instructions or checklists.

RECORD OF CHANGES

CHANGE NUMBER	DATE	DATE POSTED	POSTED BY

RECORD OF ANNUAL REVIEW

REVIEWED BY	DATE REVIEWED	REMARKS



HEADQUARTERS 30TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

56 TFW PLAN 127-15  
PLAN SUMMARY

1. PURPOSE: To provide a base program designed to minimize aircraft exposure to potentially hazardous bird strikes where the 56 TFW conducts flying operations.
2. CONDITIONS FOR EXECUTION: This plan is based on hazards from both indigenous bird populations and seasonal bird migration. Implementation of specific portions of the Plan are continuous, while other portions require implementation as dictated by bird activity.
3. OPERATIONS TO BE CONDUCTED:
  - a. Specific Operations Include:
    - (1) The establishment of a Bird Hazard Working Group.
    - (2) Procedures for reporting hazardous bird activity and altering/discontinuing flying operations.
    - (3) Provisions to provide information to all assigned aircrews and transient aircrews on specific bird hazards and procedures for avoidance.
    - (4) Actions to eliminate/reduce environmental factors which attract birds to the airfield.
  - b. Organizations Tasked: As listed in ANNEX A
  - c. Supporting Plans not required.

HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

56 TFW PLAN 127-15  
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OPR: 56 TFW/SE

iv



HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

56 TFW PLAN 127-15 - BIRD AIRCRAFT STRIKE HAZARD  
BASIC PLAN

REFERENCES: AFR 127-15  
BASH Survey  
Other (Reports, letters and supportive material provided  
by competent biologists or wildlife managers)

TASK ORGANIZATION: ANNEX A

1. SITUATION:

a. GENERAL. This Plan establishes an overall bird control program for MacDill Air Force Base and is designed to minimize aircraft exposure to potentially hazardous bird strikes or strikes with terrestrial animals. The hazards to safe flying operations posed by birds are so varied that no single solution to the bird strike problem exists. This Plan is designed to:

- (1) Establish a Bird Aircraft Hazard Working Group.
- (2) Establish procedures to identify and to communicate high hazard situations to aircrews and supervisors to determine if altering/discontinuing flying operations is required.
- (3) Determine aircraft and airfield operating procedures to avoid high hazard situations.
- (4) Provide for dissemination of information to all assigned aircrews and transient aircrews on specific bird hazards and procedures for avoidance.
- (5) Decrease the attractiveness of the airfield to birds by eliminating, controlling or reducing environmental factors which support the birds.

b. AIRFIELD/LOCAL AREA. MacDill AFB occupies 5620 acres in Hillsborough County, Florida, and is located on a natural peninsula between old and new Tampa Bays. The mean elevation of the base is 13 feet above Mean Sea Level (MSL). MacDill AFB is drained into several natural creeks, drainage ditches and by tidal action. There are approximately 890 acres of undeveloped land on MacDill AFB most of which is on the south side of the base complex. The underdeveloped land mainly consists of Red, Black, and White Mangrove with a small proportion being planted Pine with varied understorey, mature Pine with mixed understorey of Pine, Grass, Pine Brush, Scrub Oak and Palmetto.

The southwestern portion of the base is being invaded by Florida Pepper and mixed brush. The area adjacent to the runway consists of a mix of Florida grasses where closely maintained. The infield area which is only periodically maintained is being invaded by Dog Fennel, Ragweed, Sesbania and some brush, consisting of Wax Myrtle, Florida Pepper, Willow and Scrub Oak. In addition, there is a 13 acre borrow pit which has been turned into a pond located just north of the field boundary adjacent to the runway and a sanitary landfill 8500 feet southeast of the runway. The Mangroves, wooded areas, pond and grasslands surrounding the airfield and the landfill provide a large variety of habitats capable of supporting birds hazardous to aircraft. In particular, the pond is attracting waterfowl; the landfill, seagulls, and the invasion by uplands vegetation is attracting upland species which have become permanent residents of the area. More specific hazards are listed in ANNEX C.

c. ENROUTE/LOW LEVEL FLYING AREAS. Aircraft flying out of MacDill generally use southern Florida as the primary enroute and low level flying area. This area has many features which attract a variety of birds from migratory waterfowl through upland species, to shore birds. The two most hazardous species being the raptors (vultures) and the migratory waterfowl. Specific enroute hazards are outlined in ANNEX C.

d. AVON PARK GUNNERY RANGE. Avon Park occupies 107,000 acres of land in Polk and Highlands counties in central Florida and most of the area is typically Southern Florida flatwoods comprised of nearly level sandy flatlands interspersed with small swamps and wet grasslands. Other parts of the area are fragmental remains of a relatively high sand ridge consisting of droughty sands interspersed with small, poorly drained areas and few ponds. The flatwoods represent approximately 57,000 acres of the area. Of this, 27,000 acres have been reforested with slash pine, starting in 1965. Plantations were established in various sized blocks and are distributed throughout the type. Approximately 4,000 acres of this type are stocked with natural stands of slash pine of 30-50 years of age. The remaining area is essentially unstocked, with saw palmetto, gallberry, and native grasses comprising the majority of the cover. Approximately 20,000 acres of small swamps and wet grasslands are interspersed throughout the flatwoods type. These areas vary considerably in size and vegetation, from open ponds with marsh grasses; dense hardwood swamps with various species of gums, bays, ash and maple; pond and bald cypress stands of varying ages; and two extensive marshes, one of approximately 3200 acres located along the southwest boundary of the installation, the other approximately 2800 acres located along the southeast boundary. The sand ridge area comprises 9400 acres, oriented north-south in the center of the installation. This type is made up of sand pine of 10-40 years of age in dense stands, open scrub oak associations with scattered long leaf pine, and long leaf pine stands, 40-60 years old. The terrain in and around Avon Park provides an abundant variety of habitats for birds that are hazardous to aircraft. Specifics are outlined in ANNEX C.



### 3. EXECUTION:

#### a. CONCEPT OF OPERATIONS:

(1) Overall OPR and monitor for the implementation of this Plan is the 56 TFW Office of Safety.

(2) Bird Aircraft Hazard Working Group.

(a) Function. Review data on bird strikes, identify and initiate actions to reduce hazards, review and implement changes in operational procedures, prepare informational programs for aircrews.

(b) Authority. The BASH Working Group submits all efforts to the operational commander for approval. Implementation is through normal chain of command.

(c) Composition. The chairman, as appointed by the Commander, will be the 56TFW Vice Commander. As a minimum, the group will consist of a representative from Current Operations, Standardization/Evaluation, Flight Safety, Airfield Management, Civil Engineering, the flying organizations and representatives from other Task Organizations (ANNEX A) as required.

(d) Meeting Schedule. Quarterly.

(3) Operating Procedures. (As defined by the BASH Working Group and approved by the Commander of Higher Headquarters as appropriate).

b. TASKS: ANNEX B outlines the general and continuing tasks and responsibilities for each organization. ANNEX C lists specific tasks to counter hazards that are discovered and will remain in effect only until the hazard is removed or reduced sufficiently as determined by the seasonal nature of the hazard or by the BASH Working Group.



ANNEXES:

A - Task Organization

B - Tasks and Responsibilities

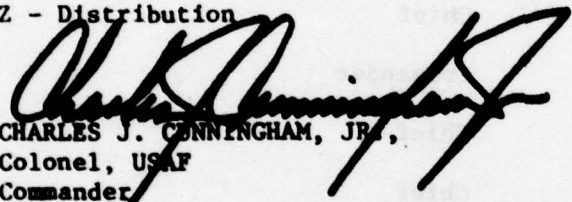
C - Operations

Q - Maps and Charts

R - Reports and Forms

S - Bird Hazard Warning System, Operation Birdwatch

Z - Distribution

  
CHARLES J. CUNNINGHAM, JR.,  
Colonel, USAF  
Commander

HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

ANNEX A TO 56 TFW PLAN 127-15  
TASK ORGANIZATION

ORGANIZATION

COMMANDER

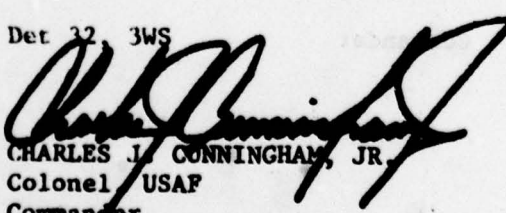
56 TFW	Commander
56TFW/DO	Deputy Commander
56 TFW/MA	Deputy Commander
56TFW/SE	Chief
56TFW/OI	Chief
USAF Regional Hospital	Commander
56CSG/DE	Chief
56CSG/SV	Chief
56CSG/DC	Chief
56CSG/OTM	Chief
56CSG/SS	Chief
56CSG/SP	Chief
1928CG/FPA	Chief
13TFTS	Commander
61TFS	Commander
62TFS	Commander
63TFS	Commander
56CSS/OT	Operations Officer
Det 22, 3WS	Commander

  
CHARLES J. CUNNINGHAM, JR.  
Colonel, USAF  
Commander

OPR: 56TFW/SE

HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

ANNEX A TO 56 TFW PLAN 127-15  
TASK ORGANIZATION

<u>ORGANIZATION</u>	<u>COMMANDER</u>
56 TFW	Commander
56TFW/DO	Deputy Commander
56 TFW/MA	Deputy Commander
56TFW/SE	Chief
56TFW/OI	Chief
USAF Regional Hospital	Commander
56CSG/DE	Chief
56CSG/SV	Chief
56CSG/DC	Chief
56CSG/OTM	Chief
56CSG/SS	Chief
56CSG/SP	Chief
1928CG/FFA	Chief
131TFS	Commander
61TFS	Commander
62TFS	Commander
63TFS	Commander
56CSS/OT	Operations Officer
Det 32, 3WS	Commander
	
CHARLES J. CUNNINGHAM, JR. Colonel USAF Commander	
OPR: 56TFW/SE	



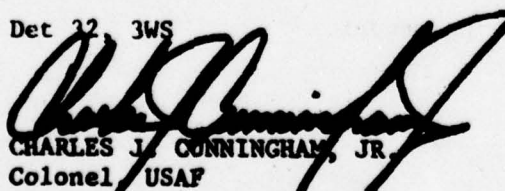
HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

ANNEX A TO 56 TFW PLAN 127-15  
TASK ORGANIZATION

ORGANIZATION

COMMANDER

56 TFW	Commander
56TFW/DO	Deputy Commander
56 TFW/MA	Deputy Commander
56TFW/SE	Chief
56TFW/OI	Chief
USAF Regional Hospital	Commander
56CSG/DE	Chief
56CSG/SV	Chief
56CSG/DC	Chief
56CSG/OTM	Chief
56CSG/SS	Chief
56CSG/SP	Chief
1928CG/FFA	Chief
13TFTS	Commander
61TFS	Commander
62TFS	Commander
63TFS	Commander
56CSS/OT	Operations Officer
Det 22, 3WS	Commander

  
CHARLES J. CUNNINGHAM, JR.  
Colonel USAF  
Commander

OPR: 56TFW/SE

ANNEX B TO 56TFW PLAN 127-15  
TASKS AND RESPONSIBILITIES

1. Safety:

- a. Include BASH group recommendations and actions in the agenda and minutes of the Wing Aerospace Safety Council.
- b. Establish procedures for reporting and recording all birdstrikes at MacDill or involving 56TFW aircraft.
- c. Monitor activities of all tasked agencies for compliance with this directive.
- d. Disseminate trend data to BASH group and flying units.
- e. Coordinate with Safety Offices at Homestead and Patrick AFB concerning their BASH activities in the local flying area and at Avon Park. (Crosstell)
- f. Provide the BASH Working Group with the current BASH reduction data received from Higher Headquarters, the U.S. Fish and Wildlife Service and other agencies.
- g. Provide a capability for and maintain a current bird situation/activity chart for use by all flying units. This will include:
  - (1) BASH activity plotting/recording for low level and Avon Park operations.
  - (2) MacDill activity, sightings and strikes.
- h. Provide in addition to the above, as much information concerning bird migratory activities as can be obtained through contact with the U.S. Fish and Wildlife Service and local bird study groups.
- i. Provide a capability for declaring, disseminating, and terminating BIRDWATCH Conditions on the Low Level routes and at Avon Park.
- j. Coordinate and establish procedures with the Security Police to provide an individual to use pyrotechnic devices for bird dispersal as required when Security Police personnel are not available.

2. HOSPITAL:

- a. The MacDill Regional Hospital will provide assistance, advise

and support to the MacDill BASH Program as required and within capabilities to include:

(1) Provide storage space within mortuary area for the storage of perishable bird remains.

(2) Assistance in packaging remains in dry ice for shipment to the bird and mammal laboratories.

3. MORALE, WELFARE AND RECREATION:

a. The 56CSG Chief of Morale, Welfare and Recreation will establish a program to minimize the attractiveness of assigned facilities to bird activity.

4. OFFICE OF INFORMATION:

a. The 56TFW Office of Information will participate as required and upon request will provide a public information program designed to inform base personnel, dependents and the general public on the hazards of uncontrolled bird activity and the measures being taken to minimize them.

5. BASE AUDIOVISUAL SERVICES:

a. Provide photographic services as required to document bird strikes and related activities as required.

b. Provide graphics as required to publicize the hazards and actions required to minimize them.

6. BASE CIVIL ENGINEER:

a. Provide an environmental officer to the BASH Working Group to monitor and advise the group on Environmental Modification. The Base Civil Engineer is responsible for developing procedures for removal or control of as many bird attractants as possible and initiating the necessary surveys and writing of environmental impact assessments and statements on procedures undertaken as required by law.

b. In addition to providing those services as required to eliminate specific habitats to counter identified hazards, the Civil Engineer should develop a long range program, in conjunction with all base improvements and modifications, in an attempt to make the airfield as unattractive to birds as feasible. This project/program should be termed operation "Bird Bare."

c. To assist in these programs the following general Civil Engineering considerations are provided:



(1) Control vegetation

- (a) Mowing Operations - (Time - height)
- (b) Ditches (cut) 50 to 1 slope (See (2)(a))
- (c) Filling low spots (See (2)(a))
- (d) Planting bare areas
- (e) Removing dead vegetation/rubble (Perches)
- (f) Remove high spots (Perches)
- (g) Remove edge effect
- (h) Remove plants with berries

(2) Control water

- (a) Modify ditches - slope and clear (See (1)(b))
- (b) Consider covering/culverts
- (c) Eliminate standing water (See (1)(c))
- (d) Patrol/clear beaches and rip edge of feeding materials
- (e) Drain marsh areas

(3) Control waste

- (a) Collect appropriately
- (b) Dispose of rapidly

(4) Control birds (Chemical/Physical Alterations)

- (a) Check/bird proof buildings - hangers
- (b) Check other perches towers, etc.
- (c) Use avitrol as required
- (d) Use naphthlene around perches (Alt)
- (e) Sticky material around perches (Alt)
- (f) Electrical charge around perches (Alt)

(g) Strobes in buildings

(h) Queletox (Kill)

(i) Control insects

**7. FLYING ORGANIZATIONS:**

a. Will insure aircrews participate in the BASH reduction program by promptly reporting all bird strikes and hazardous conditions IAW this directive.

b. Will coordinate unit flying activities, through scheduling, to minimize exposure to migratory birds based on data obtained from SEF/BASH.

c. Unit FSOs will periodically visit SEF, obtain the current bird activity data and post the information so that it is readily available for briefing aircrews. Frequency of visits will be determined by phase of training unit is currently undergoing.

d. Unit FSOs will insure that the current bird activity data is available and briefed in conjunction with the prephase briefing for both the ground attack and low level phases.

e. Unit FSOs will insure an adequate supply of bird strike/activity report forms are readily available for the aircrews.

**8. STANDARDIZATION/EVALUATION:**

a. Review with 56TFW/DOO all proposed new low level routes or changes to existing low level routes for BASH impact.

b. Monitor, on a regular basis, aircrew preflight briefings to insure BASH is covered during the briefing.

**9. AVON PARK OPERATIONS:**

a. Establish procedures to report significant bird activity noted on the gunnery ranges to SEF and advise aircrews under their control of same.

b. Establish procedures to notify SEF of any bird activity or strikes reported to Avon Control by aircrews.

**10. FLIGHT FACILITIES:**

a. Establish procedures to observe bird activity on and above the airfield visually and by radar, and report such to Wing Safety during normal 56TFW flight operations and to Airfield Management at other times.

- b. Issue Birdwatch advisories to aircraft as required.
- c. Provide Airfield Management immediate access to the runway under Birdwatch Condition Red if required.
- d. Insure airfield lighting remains off except as required for aircraft operations.

11. AIRFIELD MANAGEMENT:

a. IAW ANNEX S of this Plan, during normal 56 TFW flight operations the authority to declare a Birdwatch condition is solely vested with the 56 TFW Safety Office. The MacDill AFB Chief of Airfield Management or his designated representative, is the declaring authority during all other periods.

(1) Declaration of a Birdwatch condition by the Chief of Airfield Management should be based upon the following:

- (a) Information relayed by airborne aircraft.
- (b) Observations made by and relayed to Base Operations by MacDill AFB Tower and Transient Alert personnel.
- (c) Observations made by Base Operations personnel.

(2) Once a Birdwatch condition has been declared by Base Operations personnel, it is their sole responsibility to either cancel or downgrade the condition, commensurate with updated information.

b. The Chief of Airfield Management or his designated representatives, will be a prime source for observing conditions that could create a bird strike hazard and will react to disperse flocks of birds using available bioacoustic equipment when required.

(1) Primary Means (Prevention). Environmental conditions observed in the runway vicinity that could attract birds will be reported to the Environmental Section, 56CSG/DE, (ex., standing water areas/areas of recently mowed grass/confirmed and suspected roosting areas.)

(2) Secondary Means (Dispersal). The Chief of Airfield Management will:

- (a) Insure the Base Operations emergency response vehicle is equipped and operationally maintained with bioacoustical equipment.
- (b) Insure assigned personnel are properly trained to utilize the equipment.



(c) Coordinate directly with the 56TFW BASH Officer on results of bioacoustical dispersal of birds to insure tapes on hand are identifiable to bird species which are presenting a hazard to flight operations at MacDill AFB.

(3) Carry out those actions as required for implementation of Birdwatch procedures as outlined in ANNEX S.

12. 3RD WEATHER WING:

a. Display Birdwatch Condition notice on TV briefing equipment as required.

b. Advise aircrews of Birdwatch Conditions when briefing weather if required.

13. DEPUTY COMMANDER FOR OPERATIONS:

a. Issue specific guidance for aircrew and the SOF on procedures to be followed under Birdwatch Conditions.

b. Issue specific guidance to the Command Post concerning actions required to implement this Plan.

14. DEPUTY COMMANDER FOR MAINTENANCE:

a. Issue specific guidance to AGS personnel for the reporting of discovered bird strikes on aircraft to Quality Control and Safety.

b. Issue procedures for the preservation of bird remains (feathers) during non-duty hours if discovered on an aircraft.

15. SECURITY POLICE:

a. Provide location and procedures for storing pyrotechnic bird dispersal devices.

b. Train personnel to use pyrotechnics as required.

c. Coordinate with Safety for alternate users from Safety when Security Police personnel are not available.

  
CHARLES J. CUNNINGHAM, SR.,  
Colonel, USAF  
Commander

HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

ANNEX C TO 56 TFW PLAN 127-15  
OPERATIONS

REFERENCES: (Bird/Aircraft Strike Hazard Team Reports, Reports from other wildlife agencies, etc.)

1. GENERAL:

a. PURPOSE. This ANNEX provides information on the different types of bird strike hazards and recommendations on countering each hazard.

b. MISSION. See Basic Plan.

2. CONCEPT OF OPERATIONS. The following is a summary, in order of seriousness, of the bird strike hazards and recommendations for reducing each hazard to flight operations. A brief description of each bird and how each method of control or avoidance is to be employed is provided. Each control measure will have a corresponding tasked organization in the Basic Plan.

3. SPECIFIC HAZARDS:

a. MACDILL AFB AREA:

(1) Brown Pelican (*Pelecanus Occidentalis*).

(a) Hazard: This protected species can be seen frequently on the catwalks of the approach lighting for runway 04. It also flies in small flocks (3-6 birds) in varied formations. Pelicans feed primarily on small fish and dive from altitudes of 30 feet or less. The primary threat occurs when the small flocks transit the runway approaches and departures in search of food.

(b) Hazard Reduction: Habitat modification is not feasible nor desirable for this species. The primary counter to this hazard is increased awareness by aircrews and runway supervisory personnel. The approaches should be closely monitored for their activity and appropriate advisories should be transmitted as required. OPR: 56TFW/DO/OTM.

(2) Seagulls (*Charadriiformes, Laridae*).

(a) Hazard: This species provides the largest threat to flight operations in the airfield area. Several subfamilies are permanent residents of the bay area as well as a migratory hazard. Seagulls are primarily scavengers and gather at garbage dumps, docks and other lucrative sources of food. Their travels from roost to food source to loafing areas constitute the greatest hazards.

OPR: 56TFW/SE

(b) Hazard Reduction: Habitat modification and control techniques must be devised to effectively reduce the threat.

1. The source of easy food within the general airfield area must be reduced to an absolute minimum. The sanitary landfill operation must be closely monitored as it is the major attractant and food source. OPR: 56CSG/DE

2. Once the food source is eliminated, action should be taken to reduce the attraction of the loafing areas such as clear ramp space and closely mowed fields through the use of harassment and dispersal procedures such as:

- a. Pyrotechnics
- b. Bioacoustics
- c. Chemicals
- d. Mowing operations


OPR: 56CSG/OTM/DE

3. Sources of fresh drinking water near loafing areas must also be eliminated. OPR: 56CSG/DE

(Other resident species in the immediate area which need to be studied include:

Raptors; owls, nighthawks, doves, Cattle; egrets, common crows, shorebirds, plovers, pipers, upland species; blackbirds, starlings.

In addition to the migratory species: Waterfowl, Ibus, Cranes.)

  
JOHN R. VICK, Major, USAF  
Chief, Safety Division



HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

ANNEX Q TO 56 TFW PLAN 127-15  
MAPS AND CHARTS

1. GENERAL. This ANNEX outlines the use and requirements for the maps and charts required to implement the BASH Program to include:

- a. MacDill AFB Habitat Map.
- b. Low level Activity map.
- c. Avon Park Activity Plotting Charts.
- d. Airfield Activity Plotting Charts.
- e. (As required).

2. MACDILL AFB HABITAT MAP:

a. Background: A habitat survey was conducted at MacDill AFB in August 1978 and the specific habitats which are available to birds were determined. The description of the habitats and modifiers are in APPENDIX Q-1-1 of this ANNEX. A copy of the survey is maintained at the Environment Office (DEEV) and the Safety Office.

b. Use: Once a specific hazard is identified and the location of the activity can be isolated, the habitat map should be consulted to determine if a specific attractant to that species exists which can be altered within the scope of this program.

c. The habitat map will also be used as a guide for the long range Civil Engineering Program of removal of actual and potential habitats on MacDill AFB; proposed Operation "Bird Bare."

3. LOW LEVEL ACTIVITY MAP:

a. A large scale map with a depiction of all the current low level routes will be maintained at the Office of Safety, (SEF).

b. All bird strikes, near misses and areas of observed significant bird activity which are reported on the low level routes will be plotted on this chart.

c. This data will be studied and disseminated to the flying units IAW the procedures outlined in ANNEX B.

d. This data will also be used to determine if certain route usage be discontinued or altered.

4. AVON PARK ACTIVITY MAP:

OPR: 56TFW/SE

a. A large depiction of the Avon Park Gunnery complex will be maintained at the Office of Safety, (SEF).


b. This depiction will be used in the same manner as the Low Level Map.

5. AIRFIELD ACTIVITY PLOTTING CHARTS AND LOGS:

a. Sufficient quantities of the Airfield Activity Plotting Chart will be kept available for use during surveys and bird study operations.

b. The specific use of these charts and log, APPENDIX Q-1-3, 4 and 5 will be outlined as required during the specific operation or as determined by the BASH Working Group.

6. (Other Maps & Charts will be added as required)

  
JOHN K. VICK, Major, USAF  
Chief, Safety Division

HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

APPENDIX 1 TO ANNEX Q TO 56 TFW PLAN 127-15  
MACDILL AFB HABITATS

**Water:**

- |                             |                               |
|-----------------------------|-------------------------------|
| Modifier - Drainage ditches | Varies from fresh to salt.    |
| - Borrow ponds              | Strength depending upon site. |
| - Natural ponds             |                               |
| - Tidal creeks              |                               |
| - Open bay                  |                               |

**Mangrove: Red, Black and White**

- Modifier - Mangrove along drainage ditches and on higher sites  
invaded by Florida Pepper bushes

**Hardwood Hammock: Oak**

**Grass:**

- Modifier - Closely maintained in and around runway and primary roads.  
- Periodically maintained in fields, irrigation site, etc.  
May be invaded by Dog Fennel, Ragweed, Sesbania and some brush.  
- Disturbed sites where grass is primary invader, but being replaced by brush.

**Wet Grass:**

- Modifier - Areas, either natural or manmade, where moist soil, plants, red root, Sagittaria, Beakrush, Cyperus, etc, dominate.

**Borrchia, Glasswort Flats:**

- Modifier - Type is largely being lost in invasion by Florida Pepper.  
- Type also contains Slat bush (Baccharis) invaders.

**Brush: Wax Myrtle, Florida Pepper, Willow and Scrub Oaks**

- Modifier: Bush areas closest to salt water environments are predominantly Florida Pepper which has invaded and masked native species.  
- Upland sites are Wax Myrtle and Saltbush. They contain a variety of species as transition area to high uplands.  
- Upland brush contains Saw Palmetto, Scrub Oaks, Wax Myrtle, etc.  
- Disturbed areas contain a mixture of broad leaf (Dog Fennel and Ragweed) and brush (Wax Myrtle, Florida Pepper, etc.)

**Planted Pines:**

- Modifier - Understory varies depending upon original site.

OPR: 56TFW/SE



**Mature Pines:**

- Modifier** - Pine hardwood where pine is mixed with Scrub Oak and Palmetto.
- Pine/grass where grasses are mixed with broadleaf plants and appear to vary from closely to occasionally maintained.
- Pine/brush where pine over-story is reduced with heavy brush under-story varying with site from Florida Pepper to Palmetto, Cabbage Palm, Vita and Wax Myrtle.

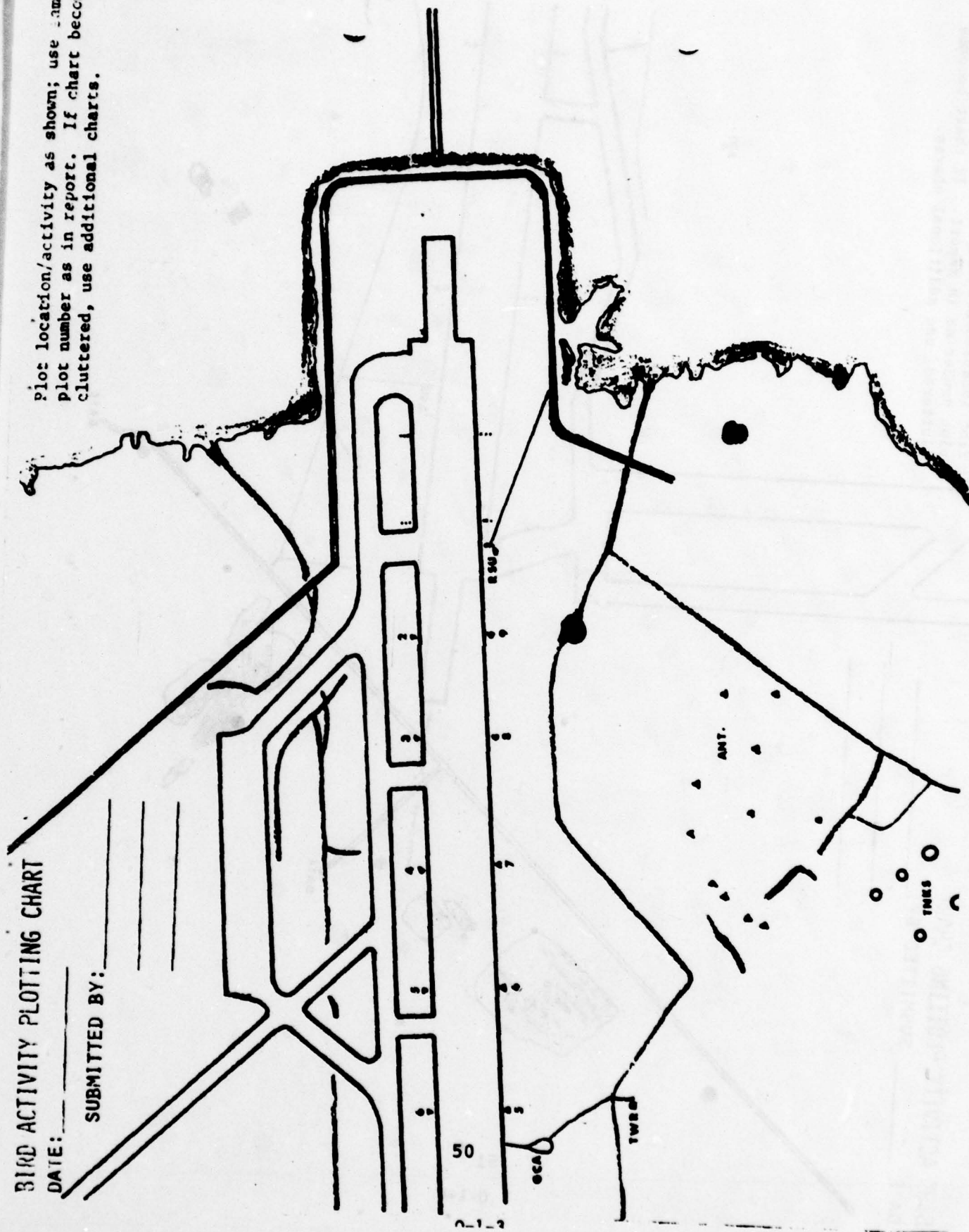
  
**JOHN R. VICK, Major, USAF**  
**Chief, Safety Division**

# BIRD ACTIVITY PLOTTING CHART

DATE: \_\_\_\_\_

SUBMITTED BY: \_\_\_\_\_

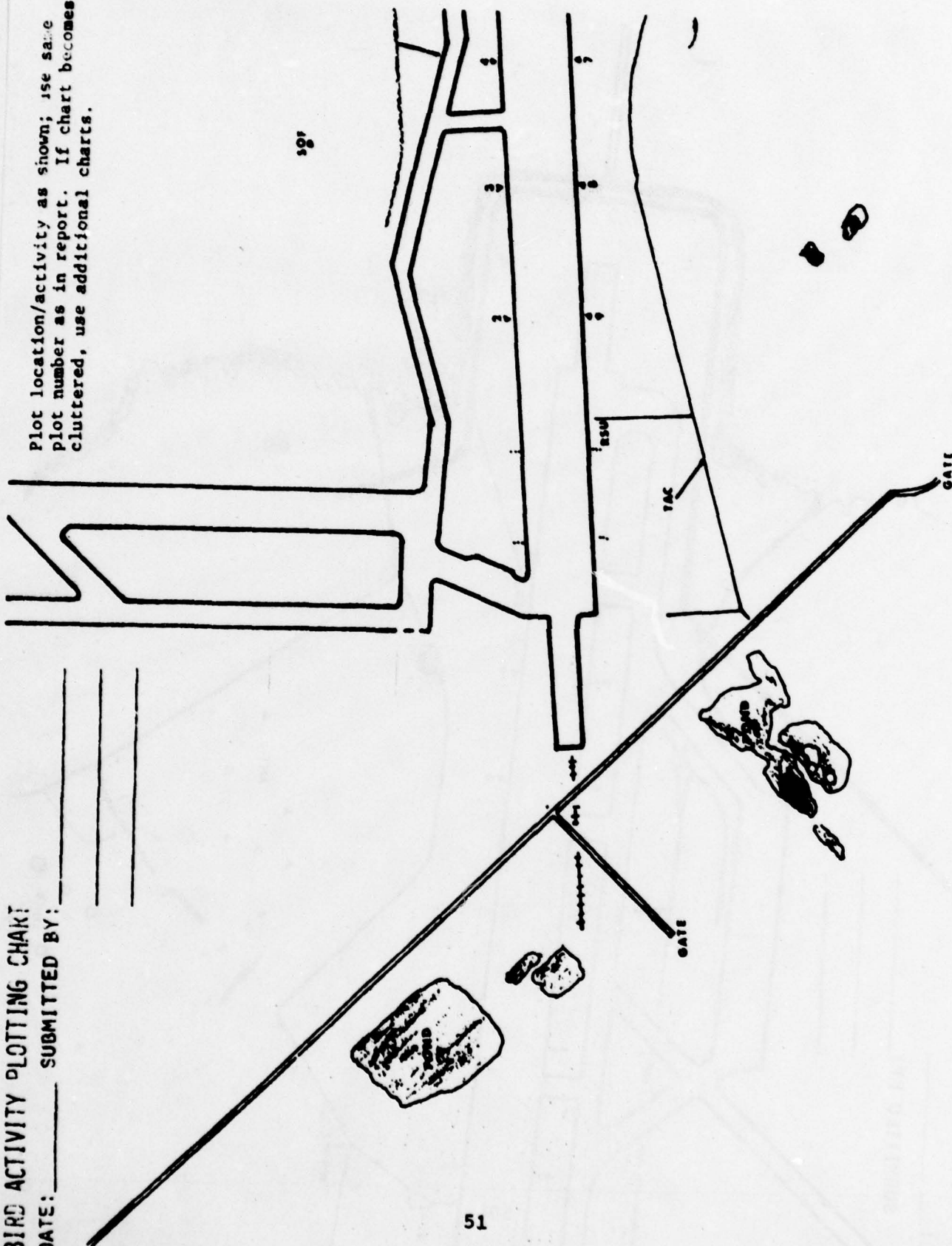
Plot location/activity as shown; use same plot number as in report. If chart becomes cluttered, use additional charts.



# BIRD ACTIVITY PLOTTING CHART

DATE: \_\_\_\_\_ SUBMITTED BY: \_\_\_\_\_

Plot location/activity as shown; use same plot number as in report. If chart becomes cluttered, use additional charts.







FROM: SQUADRON: \_\_\_\_\_ AIRCREW: \_\_\_\_\_ CALL SIGN: \_\_\_\_\_ DATE: \_\_\_\_\_

SUBJECT: Bird Aircraft Strike Hazard (BASH) Report

TO: 56 TFW/SEF

This report is to be filled out for all actual birdstrikes and any near-miss situations. Your help, in particular, on close encounters will greatly help in getting action taken to reduce the hazards involved with birds in our local flying area. Fill in all blocks as well as you can. Give approximations if exact data is unknown and indicate that it is an approximation. If you have any questions, call 56 TFW/SEF, 3384.

- a. Month/day of occurrence: \_\_\_\_\_ Local time: \_\_\_\_\_
- b. Light conditions (circle or use other is significant): Dawn, Hazy, Bright, Dull, Dusk, Dark, Night, other: \_\_\_\_\_
- d. Aircraft type: \_\_\_\_\_ Aircraft serial number: \_\_\_\_\_
- e. Landing light (ON/OFF): \_\_\_\_\_ Beacon (ON/OFF): \_\_\_\_\_
- f. Phase of flight (describe): \_\_\_\_\_
- g. Aircraft speed: \_\_\_\_\_ Heading: \_\_\_\_\_ Altitude: \_\_\_\_\_ MSL.
- h. Flight path (in relation to clouds if any, i.e., above, below, etc.) \_\_\_\_\_
- i. Geographic location: (try to be as specific as possible) \_\_\_\_\_  
coordinates: \_\_\_\_\_ if in pattern (flare, short final, etc.) \_\_\_\_\_ any ground references: \_\_\_\_\_
- j. Species and number of birds (if unknown, try to describe color, size, etc.): \_\_\_\_\_
- k. Impact point on aircraft (if applicable): \_\_\_\_\_
- l. Remarks (any information you may feel valuable to the program, i.e., what were the birds doing when you saw them?) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- m. Evasive action:
- (1) By pilot (YES/NO) \_\_\_\_\_ What? \_\_\_\_\_
- (2) By bird (YES/NO) \_\_\_\_\_ What? \_\_\_\_\_
- n. Bird remains on aircraft (YES/NO): \_\_\_\_\_  
Scrap whatever feathers, flesh, etc., that are available into a plastic bag (obtainable from Maintenance) and notify Safety, ext. 3384 ASAP. The remains will be collected by a representative from Safety for evaluation.

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HEADQUARTERS 56TH TACTICAL FIGHTER WING  
MACDILL AFB, FLORIDA 33608  
30 JULY 1978

ANNEX S TO 56 TFW PLAN 127-15

BIRD HAZARD WARNING SYSTEM: OPERATION BIRDWATCH

1. GENERAL. This operation establishes procedures to be used for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds which could pose a hazard to flight.

2. BIRD WATCH CONDITIONS. The following terminology will be used for rapid communications to disseminate bird activity and implement unit operational procedures. The terminology will also be included and updated as required in the MacDill AFB portion of the Flight Information Publication (IFP Supplement -United States).

a. Bird Watch Condition Red. Heavy concentrations of birds above and immediately in the vicinity of the runway pose an immediate hazard to safe flying operations. The area declared "Red" shall be open only by specific pilot request upon being advised of the condition.

b. Bird Watch Condition Yellow. Concentrations of birds observed or predictable in locations which represent a probable hazard to safe flying operations. Declaration of Condition "Yellow" requires increased vigilance by all agencies and extreme caution by aircrews. Bird Watch Condition Yellow will also be used for warning aircrews of conditions on low level routes and at Avon Park as warranted.

c. Bird Watch Condition Green. Normal bird activity in the area. This condition will be in effect for the remainder of the flying day whenever a red or yellow condition had been declared and subsequently downgraded. Upon extended normal bird activity, no bird watch condition need be declared.

3. AUTHORITY. During normal 56TFW flight operations the authority to declare a Bird Watch Condition is solely vested with the 56TFW Safety Office. The MacDill AFB Chief of Airfield Management or his designated representative, is the declaring authority during all other periods.

Bird Watch Condition Yellow will be declared for a special area upon the advice of tower, RSU Officers, RCO at Avon Park, GCA, or flight leads on low level routes when significant activity is observed visually or on radar. All operations personnel should be alert for bird activity and should report such directly to Safety (ext 3384) or Airfield Management (ext 2231) as applicable, or through one of the following agencies:

a. Wing SOF

b. Control Tower or GCA

OPR: 56 TFW/SE

- c. Command Post
- d. RSU
- e. Avon Operations

4. COMMUNICATIONS. Bird Watch Conditions will be disseminated by the following means:

a. During periods of 56 TFW Flight Operations:

(1) The reported Bird Watch Condition at MacDill AFB and associated low level routes will be displayed on Det 32, 3rd Weather Wing TV briefing equipment. The display (Attachment S-1-1) will be prepared and updated by Base Operations personnel based upon inputs from the 56TFW Safety Office. In addition to posting the Bird Watch Condition on the weather TV equipment, Base Operations personnel will insure that a duplicate copy of the information is posted in the Flight Planning Room to advise Transient aircrew personnel.

(2) Base Operations personnel will telephonically notify the following agencies of Bird Watch Conditions:

- (a) 56TFW Command Post
- (b) MacDill AFB Tower

b. During period of non-56TFW flight operations all procedures listed above will be implemented with the exception of posting the Bird Watch Condition on the TV briefing equipment.

c. The primary means of transmitting Bird Watch Conditions to airborne aircraft will be via ATIS. However, under Bird Watch Condition Red, the MacDill Air Traffic Control Agency will insure that the pilot understands the condition and is provided the option to delay, divert, or to continue the proposed operation into the hazardous area.

5. AIRCREW RESPONSIBILITIES AND PROCEDURES. If while in flight, an aircrew observes or encounters any bird activity that would constitute a hazard to flight the aircrew should contact either the SOF, Control Tower, Command Post, or Avon Operations and request that the observed bird activity be passed to SEF at extension 3384. The following information should be included:

- a. Call Sign
- b. Location
- c. Altitude

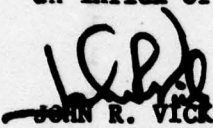
# **BIRD WATCH**

## **CONDITION**

	MCF	IRs	Remarks
<b>GREEN</b>			
<b>YELLOW</b>			
<b>RED</b>			



- d. Local time of sighting
  - e. Approximate number of birds
  - f. Type of bird (if known)
6. PROCEDURES FOR SOP AND DOC. If a bird activity report is received from an airborne aircraft, the Wing Safety Office or Base Operations will be notified as appropriate.
7. DOWNGRADING. Once a Bird Watch Condition has been declared by Safety or Base Operations personnel, it is their sole responsibility to either cancel or downgrade the condition commensurate with updated information.
8. BIRD WATCH ALERT. In addition to Bird Watch Conditions of RED, YELLOW and GREEN, a Bird Watch Alert may also be declared. This indicates that the weather, time of day and/or seasonal conditions are such as to expect an influx of birds onto the airfield.

  
JOHN R. VICK, Major, USAF  
Chief, Safety Division

HEADQUARTERS 56TH TACTICAL FIGHTER WING  
 MACDILL AFB, FLORIDA 33608  
 30 JULY 1978

ANNEX 2 TO 56 TFW PLAN 127-15  
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62 TFS	1
63 TFS	1
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DE	3
SV	1
DC	1
OTM	2
SS	1
SP	1
CSS	2
<u>OTHER UNITS</u>	
1928 CG/FFA	1
USAF Regional Hospital	1
Det 32, 3 WS	1

OPR: 56 TFW/SE

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**APPENDIX C**



WING SAFETY OFFICE  
18th Tactical Fighter Wing (PACAF)  
APO San Francisco 96239

FSOI 127-15

## FLIGHT SAFETY

### BIRD STRIKE REDUCTION PROGRAM

This FSOI establishes the procedures for management of the BIRD STRIKE REDUCTION PROGRAM.

1. References: AFR 127-15, PACAF SUP 1.

2. General: Bird Strikes throughout the Air Force cost in resources, man-hours for repair and even lives. AFR 127-15 requires each flying installation to have a program to reduce the number and severity of bird strikes. The 18TFW Flight Safety Office has evaluated the wing's Bird Strike Reduction Program. A review of local bird strikes over the past few years indicates Kadena AB does not have a serious bird strike problem. There are no major migratory routes in the vicinity of local air operations which greatly reduce the large number of transitory birds. Flocks of birds indigenous to coastal regions do present a potential hazard and deserve some attention.

3. Procedures:

a. The program to reduce bird strikes is divided into two basic areas. Limit bird congregations by management of the environment to eliminate natural attractions for birds; establish procedures to alert aircrews of bird strike hazards and limit exposure of aircraft to known high potential bird strike areas.

(1) To determine environmental factors affecting birds, a survey of the existing situation at Kadena AB will be made on an annual basis. The results of the latest survey revealed the following findings.

(a) Water drainage adjacent to the runways, as well as the base proper, was found to be very good. There were no areas of standing water, even after heavy rainfall, in which insects can breed and attract the bird population.

(b) The grass surrounding the runways and the ramp area is presently being cut at the rate of once a month due to the shortage of men and equipment. Although this rate does not preclude the grass from seeding it does offer two indirect advantages. First, the taller grass makes it inconvenient for birds to land, so they overfly the runway

less frequently than if the grass was shorter. Secondly, the taller grass adds to the difficulty of locating ground insects which further decreases bird concentrations.

(2) In addition to the control of environmental factors advisories of bird concentrations and avoidance of the most hazardous areas can reduce bird strikes. The following procedures are in effect in the 18TFW.

(a) Prompt and accurate advisories are provided by tower, approach control and range personnel to aircrews of any possible conflict with birds in sufficient quantity to create an obvious hazard to flying operations.

(b) Current low level routes at Kadena are flown above the altitudes of the heaviest bird concentrations (0-1,000 ft). The major portion of all routes is over open water, which decreases the possibility of confrontation, however, good visual lookout procedures are stressed.

(c) Aircrews are periodically briefed on the hazards of bird strikes and are encouraged to use the helmet visor(s) day and night, except in the interest of safety in marginal weather conditions.

b. All bird strikes are reportable to the wing flight safety office whether there is damage or not. The details of the bird strike are recorded on AF Form 441 at the time of the incident. This is located in the bird strike folder, 15-c of the files. This information is compiled at the end of each quarter and sent to 5AF and PACAF IAW AFR 127-15 and PACAF SUP 1. The information is also used to determine trends and further evaluate the seriousness of the bird strike problem at Kadena.

JAMES T. BRENNAN, Capt, USAF  
Chief of Flight Safety

1 Atch  
AF Form 441

**APPENDIX D**



DEPARTMENT OF THE AIR FORCE  
Headquarters Pacific Air Forces  
Hickam Air Force Base, Hawaii 96853

PACAF SUPPLEMENT 1  
AFR 127-15  
27 October 1978

**Safety**

**THE BIRD STRIKE HAZARD REDUCTION PROGRAM**

AFR 127-15, 23 January 1978, is supplemented as follows:

3f(1). Bird migratory patterns will be considered in low level route planning in accordance with PACAFR 51-1, Low Level Navigation.

3f(2). PACAF operates over widely varying terrain and climatic conditions. Each unit is faced with differing levels of exposure to bird strikes. To effectively counter these threats, each unit must tailor local programs to enhance bird control measures and develop techniques for bird avoidance. In organizing an installation bird strike hazard reduction program, each unit will comply with paragraph 4, as supplemented.

3f(4). Unit bird strike hazard reduction programs will be monitored during HQ PACAF/SE Staff Assistance Visits.

3f(5). Bird strike hazards will be considered in OPlan/XPlan development.

4b. Coordinate bird control procedures/methods with host nations, through NAFs, to ensure compliance with local environment and conservation customs/laws.

4d(Added). Unit safety officers will ensure unit, temporary duty, and transient aircrews are aware of local bird strike hazards and warning systems. This includes detached operating units.

5a. Forward these reports to HQ PACAF/SE to arrive no later than 1 May; 1 August; 1 November; and 1 February. Provide information copies to NAFs/ADs as appropriate.



T. D. CAMERON, Colonel, USAF  
Director of Administration

JAMES D. HUGHES, Lt General, USAF  
Commander in Chief

Supersedes AFR 127-15/PACAF Sup 1, 12 April 1978.

No of Printed Pages: 1

OPR: SEF (Maj T.R. Bongartz)

Approved by: Lt Col R.J. Herculson Jr

Editor: TSgt W. McCummings

Distribution: F;X

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DEPARTMENT OF THE AIR FORCE  
HQ 3d Combat Support Group (PACAF)  
APO San Francisco 96274

CLARK AB SUPPLEMENT 1  
AFR 127-15  
7 May 1979

### Safety

#### THE BIRD STRIKE HAZARD REDUCTION PROGRAM

AFR 127-15, 23 January 1978, is supplemented as follows:

3g. (Added) Clark AB Operational Procedures:

- (1) The Chief of Safety will coordinate with the Deputy Commander for Operations (3 TFW/DO) on all low-level routes and operating areas to comply with AFR 127-15.
- (2) Pilots observing potentially hazardous increases in bird activity on approved routes or areas will report this as soon as possible to their squadron operations and 3 TFW/DO. The 3 TFW/DO will change, restrict, or alter time of use as much as feasible to decrease bird strike potential while bird strike potential remains in an elevated state.
- (3) Pilots will delay takeoffs and landings whenever, in the judgment of the pilot or supervisor of flying (SOF), a serious bird hazard exists in the traffic pattern.
- (4) Aircraft will operate with all practical lighting as a bird avoidance measure.

4a. A Bird Strike Hazard Reduction Committee will be established and will be chaired by the Chief of Flight Safety. Standing members of this committee will be representatives from the Operations and Training (3 TFW/DO), Quality Control (3 TFW/MAQ), Chief, Airfield Management (3 TFW/OTM), and Base Civil Engineer (3 CSG/DE). The committee will meet on an "as required" basis at the call of the chairperson and will be responsible for coordinating the activities of all agencies involved in the bird strike program.

4b. In an effort to reduce bird hazards, the following procedures will be accomplished:

- (1) Environmental Control. The primary means of controlling birds at Clark AB will be the denial of a desirable habitat. Base Civil Engineering will:
  - (a) Apply insecticide, if funding permits, to eliminate any food source (insects) for birds.

No of Printed Pages: 3  
OPR: 3 TFW/SE (Capt Michael Sromek)  
Approved by: Lt Col Dennis C. Robertson  
Editor: B. B. Antonio  
DISTRIBUTION: F; X

PDO 5010A Hickam AFB HI 96853

HQ PACAF	
SE	- 1
DAPE	- 1
13 AF/CV	- 1
3 TFW/SE	- 5

(b) During the growing season, maintain the infield grass at a height (6 inches to 1 foot) which deters local birds from establishing a feeding ground as recommended in USAF Civil Engineering Center studies.

(c) Maintain local land fills to deny food source for birds.

(d) Plan a controlled burn program for those areas not included in the contract and in-service accomplishment. This is to be accomplished during the dry season.

(2) Bird Dispersal. Should birds congregate on and around the runway surfaces to create a hazard, Base Operations personnel will have the prime responsibility for dispersing birds. This will be done by vehicular approach or any other approved method such as carbide guns, noise generators, decoys, etc.

4c. Any personnel observing a bird strike hazard will relay that information to threatened aircraft by the most expeditious means.

(1) Air traffic control personnel either visually or electronically observing large flocks of birds in their airspace will transmit a warning to affected pilots as prescribed in current FAA directives.

(2) Pilots observing bird hazards while airborne will transmit a PIREP to their controlling agency to alert other aircraft and ground stations in their vicinity.

4d. (Added) To effectively monitor the bird strike reduction program the Flight Safety Office will:

(1) Gather and distribute material on bird strike avoidance, bird strike damage limitations, and requirements of this program to all applicable agencies.

(2) Obtain a field survey by the Bird/Aircraft Strike Hazard (BASH) Team at the USAF Civil Engineering Center if conditions warrant.

(3) Request the latest bird habitat information on a seasonal (fall and spring) basis. Applicable agencies will be contacted.

5a. The Safety Office will consolidate and forward information on all bird strikes in accordance with the basic directive.

(1) To insure timely receipt of required information, the following units will contact Flight Safety as soon as possible after learning of a bird strike to either 3 TFW or transient aircraft:

(a) Transient Alert

(b) Base Operations

(c) Command Post

(d) Squadron FSO's

(e) Maintenance Control

(2) All 3 TFW aircraft commanders will notify their squadron FSOs or Wing Safety as soon as possible after experiencing a bird strike on a local flight.



(3) On flights terminating away from home stations, aircraft commanders will report bird strikes to both the 3 TFW Command Post and the local Flight Safety Office.

5c. Whenever possible, specimens of feathers or other remains from bird strikes on aircraft recovering at Clark AB will be preserved by personnel discovering the strike. When notified of a bird strike, Flight Safety will pick up the specimens as soon as possible for identification by the Entomology Shop of Civil Engineering.

JOHN A. PARRISH, JR., Colonel, USAF  
Commander



GERALD T. O'GUIN, Captain, USAF  
Chief, Central Base Administration

## APPENDIX E

### Authorized Bird Control Equipment

For bases requiring active bird scaring techniques the following equipment is authorized for bird identification and dispersal:

<u>Nomenclature</u>	<u>NSN</u>	<u>TA</u>
Binoculars, prism type	1240-00-5300959YB	479/483
Shotgun, single barrel	1005NC121528L	479/483
Pistol, pyrotechnic	1095-00-726-5637	479/483
Simulator airburst	1370-00-028-6007	-
Shellcrackers, 12 ga.	1305ND042951G	-
Cassette Type Player	5835-01-053-3152	*
Speaker	5965-01-053-6210	*
Amplifier, mobile	5830-01-054-4954	*

\* Stocklist action has been completed and upon receipt of NC/NSN items will be added to TA 483.

This memorandum may be referenced to justify procurement of items from TA 483, which is a Civil Engineering TA. Any organization responsible for bird control on the base may procure this equipment.

**APPENDIX F**



DIRECTORATE OF ENVIRONMENTAL PLANNING  
AF Engineering and Services Center  
Tyndall Air Force Base Florida 32403

DEV Operating  
Instruction 127-1  
1 September 1979

- Safety

HANDLING OF PYROTECHNICS

This OI establishes policies and procedures for safe handling of pyrotechnics used at Air Force installations by the Bird/Aircraft Strike Hazard (BASH) Survey team. It applies to all members of the BASH team conducting such surveys and to personnel at survey bases instructed in the use of pyrotechnics by BASH team personnel.

References: (1) AFR 127-100, Explosive Safety Standards; (2) 11A-1-10, Munitions Serviceability Procedure; (3) TO 11A10-24-7, Storage and Maintenance Procedures for Pyrotechnics; (4) TO 11A-1-42, General Instructions for Disposal of Air Munitions; (5) TO 11A10-27-7, Storage and Maintenance Procedures Simulators (Battlefield).

1. This OI covers the M74A1 simulator airburst and 12 gauge scare cartridges.

2. RESPONSIBILITIES:

a. Explosives Safety Officer/NCO: Responsible for insuring compliance with this OI by all personnel who are involved in Air Force Engineering and Services Center field assistance and training activities. They will periodically review and update this OI as safety and training requirements dictate.

b. BASH Reduction Team Leader: Responsible under the guidance of the Explosive Safety Officer/NCO and acts in their absence to insure compliance with this OI by all personnel involved with AFESC field assistance activities.

c. BASH Survey Team chief under the guidance of the Team Leader BASH Reduction Program, performs all actions necessary to issue and control pyrotechnics as outlined in this OI and stated references.

d. Other BASH Team members: All field assistance team personnel must be fully knowledgeable of and adhere to the contents of this OI. Negligence or noncompliance will be considered grounds for dismissal from that portion of field assistance training and use, or administrative disciplinary action. This OI is part of the training/evaluation program and will be part of the AFESC/DEVN required reading file.

#### PROCEDURES:

a. Nature of Operations: The BASH Team frequently and recommends the use of the M74A1 Simulator Airburst, NSN1370-00-028-6007 or the 12 gauge scare cartridge, NSN 1305ND042951G for use on the airfield to disperse birds which pose a threat to aircraft. These items are shipped from Hill AFB to the AFK account (Munitions Supply) at the base to be surveyed. All team members will strictly adhere to the following rules when pyrotechnics are being used or demonstrated.

(1) Pyrotechnics will be fired at an angle of not less than 45 degrees from ground level and never in the direction of any person, vehicle, or building closer than 1,000 feet.

(2) For scare cartridges, a single barrel, break open shotgun, NSN 1005NC121528L, or other approved methods will be used. The weapon will be visually inspected following each round fired to insure that it is free of obstructions. After each day's use, the barrel will be thoroughly flushed with hot water, dried and oiled.

(3) All firearms safety rules listed on AF Form 497, Air Force Policy Statement - Firearms Safety and Use of Force will be followed (Atch 1). Failure to adhere to additional safety precautions could result in loss of limb, oversight, or life.

(a) No person shall ignite the M74A1 Airburst or 12 gauge scare cartridges without wearing leather gloves, goggles and earprotectors.

(b) There will be no smoking at any time within 50 feet of pyrotechnics.

(c) No pyrotechnics will be handled near open flames.

(d) Pyrotechnics will be kept under visual observation at all times after they are issued and until they are expended.

(e) If at any time any pyrotechnics malfunction, all personnel will stay clear of that area for a minimum of 30 minutes. The exact position of the malfunction will be brought to the attention of the BASH Team Chief. If the malfunction presents a potentially greater hazard to personnel, it will be placed in a wooden lined, metal container and removed from the immediate area. The BASH Team Chief



will then notify the Base EOD and inform them of the malfunction. They will send a team out to the area for proper disposal. At no time will the BASH personnel dispose of any malfunctioned pyrotechnics.

b. Storage of Weapons: All weapons will be stored each night at the Security Police Armory and checked out on a daily basis to support the BASH survey.

c. Storage of Pyrotechnics: All pyrotechnics will be returned to Munitions Supply each night and taken from the armory on an "as needed" basis. Cartridges will be stored in sealed metal ammunition boxes when not in use. Spent M74A1 casings will be turned in for disposal.

d. Location of Operations: Operating locations for active bird control at the base being surveyed will be on the airfield or at those base areas where birds present a significant hazard to aircraft. The Explosives Safety Officer will determine where pyrotechnic demonstrations and training will occur. In these situations, the BASH team will insure that personnel being directed in pyrotechnic use strictly adhere to this OI.

e. The following equipment is required, as a minimum, when transporting pyrotechnics.

(1) Four "Explosives 'B'" placards for vehicle transporting pyrotechnics (provided by AFESC for BASH surveys only).

(2) Pyrotechnics carrying bags/boxes and leather gloves (provided by AFESC for BASH team members only).

(3) Portable 2-way radio for control tower clearance prior to firing pyrotechnics (provided by AFESC).

f. Procedures for Pyrotechnic Operations:

(1) Demonstrations and Training.

(a) Notify all applicable offices of the location and nature of pyrotechnic operations.

(b) Proceed to area where demonstration/training is to be conducted.

(c) Brief attending personnel on the proper, safe use of pyrotechnic devices. Insure that personnel firing pyrotechnics don all applicable safety equipment.



(d) Remove pyrotechnics from storage box and insert into the flare pistol/shotgun.

(e) Grip the pistol/shotgun with both hands, angle at a minimum 45 degrees, and fire.

(f) Inspect the weapon chamber prior to each loading to insure that it is free of obstruction.

(g) After demonstration, clear the weapon, return pyrotechnics to storage container, and return them to the appropriate office.

(2) BASH team dispersal of birds:

(a) Proceed to area identified to have birds.

(b) Obtain control tower clearance to fire pyrotechnics.

(c) Don all applicable safety equipment.

(d) Remove pyrotechnics from storage box, exit vehicle, and load the flare pistol/shotgun.

(e) Grip the weapon with both hands, angle high toward target and fire.

(f) Inspect the weapon chamber and barrel prior to reloading to insure that it is free of obstruction.

(g) After bird dispersal, return pyrotechnics to storage box and return to the appropriate office.

g. Personnel Safety Requirements.

(1) BASH team personnel must annually attend the AFESC/DEOT explosive safety training course at Tyndall AFB.

(2) Personnel receiving pyrotechnics instructions will be given a safety briefing prior to BASH demonstrations.

h. Issue of Pyrotechnics:

(1) Issuance will be by the BASH Team Chief in the minimum quantities required for a specific portion of bird control or pyrotechnics demonstration.

(2) Pyrotechnics will not be used on the airfield without advance coordination with the following base organizations:

- (a) Command Post
- (b) Hospital
- (c) Security Police
- (d) Fire Department
- (e) Ground Safety/Explosives Safety
- (f) Base Commander

In the event of an emergency situation requiring birds to be dispersed from the airfield, the BASH team will request by radio to the control tower that tower personnel notify the appropriate offices of pyrotechnics use and the general location of BASH team personnel.

i. Fire Protection:

(1) All personnel using pyrotechnics will comply with regulations, directives, manuals, and TO's pertaining to fire prevention/protection.

(2) Two class 10 B/C fire extinguishers will be immediately available and in operating order.

(3) In the event of a fire on the airfield or at the demonstration area, BASH personnel will:

(a) Halt use of pyrotechnics.

(b) Attempt to extinguish the fire using the fire extinguishers.

(c) Notify the control tower and have them relay information the the Fire Department.

OFFICIAL

  
STERLING E. SCHULTZ, Col, USAF  
Director of Environmental Planning

1 Atch  
AF Form 497



## AIR FORCE POLICY STATEMENT - FIREARMS SAFETY AND USE OF FORCE

1. Every member and civilian employee of the United States Air Force has the right under the law to use reasonable, necessary force to defend himself against violent and dangerous personal attack. The limitations described herein are not intended to infringe this right but to promote weapons safety, and prevent the indiscriminate use of firearms and other types of deadly force. This policy statement applies to all personnel who bear firearms in accordance with AFR 125-26.

### 2. FIREARMS SAFETY RESPONSIBILITIES:

- To lessen the possibility of accidental discharge, firearms must be loaded and unloaded, whenever possible, at a clearing pit established at each firearms storage facility. As a minimum, loading and unloading will be supervised by a knowledgeable NCO who is also qualified with the weapon. (See AFR 125-26, paragraph 10c.)
- Firearms will not be drawn or aimed except in compliance with Air Force policy on the use of force, if necessary to lawfully apprehend or if their authorized use appears imminent or the weapon is turned into storage.
- Warning shots will not be fired. This firing is a hazard to innocent persons and may prompt a suspect to return the fire, further endangering innocent bystanders.
- If firing at a person, the marksman should aim to wound, rather than to kill.
- Because of the solemn responsibilities involved, it is imperative that prior to being authorized to bear firearms, all personnel are thoroughly indoctrinated in their use and the circumstances in which firearms may be justifiably used.
- The unauthorized discharge of any firearm, whether it is an accidental or deliberate act, is a serious matter and must be thoroughly investigated. Any person who is aware of such an incident will report it to the Chief of Security Police who will immediately initiate an investigation.

### 3. FIREARMS SAFETY RULES: I will:

- Promote firearms safety through my own actions.
- Never carry a round of ammunition in the chamber of any weapon that uses a bolt assembly or slide operating mechanism, except at my commander's direction when in combat or other hostile situation.
- Never draw firearms as a joke or jest.
- Never use a firearm to play tricks, games, quick-draw, or engage in any other form of horseplay, or allow myself to become involved in unauthorized acts.
- Never use firearms against individuals who have committed only minor offenses or crimes.
- Regard all firearms as being loaded.
- Know and use the safety devices of all firearms with which I am armed.
- Never aim or point a firearm unless I intend to shoot.
- First identify my target and insure a clear field of fire before discharging a weapon.
- Be especially cautious when loading and unloading a firearm.
- Never arm myself with a weapon I am not fully qualified to use.
- Bear in mind at all times that my conduct in handling the weapon is my own responsibility.

### 4. USE OF FORCE:

- Personnel may use force to discharge assigned duties only when force is absolutely necessary. The degree of force used must be the minimum necessary to accomplish the duty. Application of an excessive amount of force is detrimental to the maintenance of law and order and may subject the one who applies it to disciplinary action. The minimum force necessary may include physical apprehension and restraining techniques, chemical dispersers, the baton, or the military working dog; all of which result in an application of less than deadly force.
- The use of deadly force (that force applied with the intent of causing, or which a reasonable person should know would cause, death or serious bodily harm) is prohibited, except as a last resort. The use of deadly force is justifiable only as a last resort under the following circumstances:
  - To protect themselves from loss of life or serious bodily harm.
  - To protect the life of another, or to prevent the commission of a serious offense involving violence and threatening death or serious bodily harm (such as arson, armed robbery, aggravated assault, or rape).
  - To remove the threat of theft, destruction, or espionage aimed at property or information designated by an installation commander or other competent authority, as vital to national security.
  - To prevent actual theft or destruction of property designated by an installation commander or other competent authority which - although not vital to the national security - is of substantial importance to the national security. Falling within the purview of this instruction is property specifically designated as having substantial importance to the national security under the Base Resource Protection Program for example mission essential fuel storage areas, data processing installations, and other major support facilities or equipment.
  - To prevent the actual theft of property which is inherently dangerous to others, for example: property which, in the hands of an unauthorized individual, presents a potential threat of death or serious bodily harm to others. This includes weapons, ammunition, explosives, and chemical munitions.
  - To apprehend or prevent the escape of a person reasonably believed to have committed an act of the nature specified in paragraph 4b(2) above. If the official did not witness the offense, he must have sufficient information to know as a virtual certainty that the suspect either has committed, or attempted to commit, the offense.
  - To apprehend or prevent the escape of a person whose unauthorized presence in the vicinity of property or information vital to the national security has presented an actual threat of theft, sabotage, or espionage.
  - To apprehend or prevent the escape of a prisoner whose escape has been determined by the corrections officer or installation commander to create a threat of death or bodily harm to others.
  - When directed by the lawful order of a superior official governed by AFR 125-26.

I HAVE READ AND U	
DATE	
PRINT FULL NAME (Last, First,	

ATTACHMENT 1

75

SAFETY AND USE OF FORCE.

AF FORM 497 (10-1-78)

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# APPENDIX G

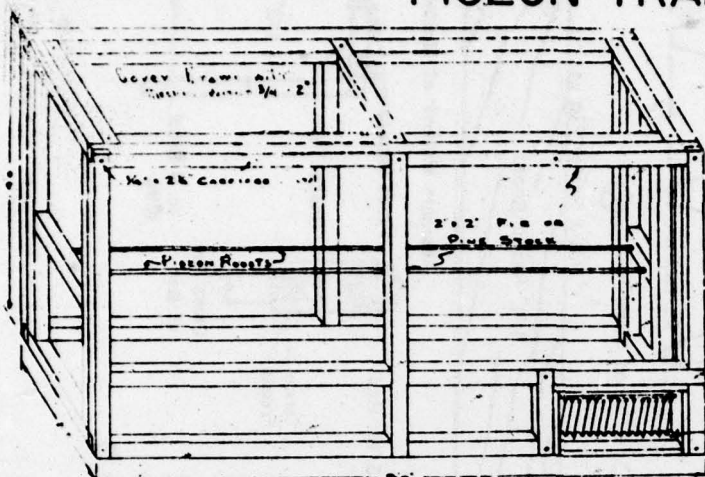
## LIST OF KOREAN WILDLIFE REFUGES

<u>Egrettries and Heronries</u>	<u>National Monument Number</u>
Chinchon, North Chungcheong Province	13
Hakseom, Samcheonpo, South Kyeongsang Province	208
Sinjeob-ri, Yeosu, Kyeonggi Province	209
Banchug-ri, Haenam, South Cheolla Province	210
Yeongwol-ri, Muan, South Cheolla Province	211
Maepo-ri, Yangyang, Kangweon Province	229
Doseon-ri, T'ongyeong, South Kyeongsang Province	231
Apkog-ri, Hoengseong, kangweon Province	248

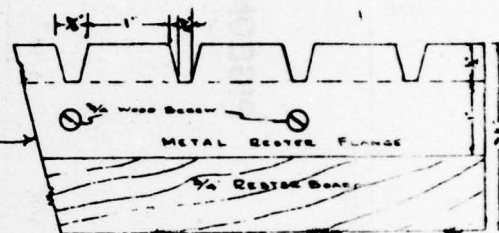
### WATERFOWL AND OTHERS

<u>Species and Habitat</u>	<u>Number</u>
The winterground for Swans in Chindo Island, South Cheolla Province	101
The Naktong River Delta colony for migratory birds, Pusan City and South Kyeongsang Province	179
The wintering colony of the Diver, Gavia around Keoje Island, South Kyeongsang Province	227
The Han River estuary for White-naped Crane, Grus vipio	250
The wintering ground for the Manchurian Crane, Grus japonensis at Yeonhi-dong and Kyeongseo-dong, Inchon, Kyeonggi Province	257

## APPENDIX H PIGEON TRAP PLAN



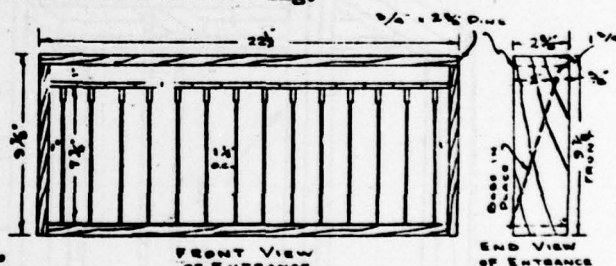
Pigeons can be caught in screened enclosures of various sizes and shapes. For large-scale trapping, it is well to use a trap of dimensions similar to those shown in this leaflet.



This size trap is capable of large daily catches and enables a person to enter and remove the birds through a small door constructed in the end of the trap. Although large traps are preferred, good catches have been made with poultry crates and other small enclosures.

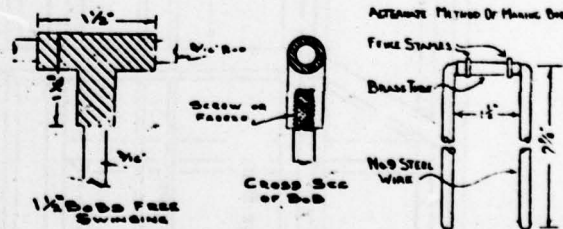
The construction of a trap with 1 x 2 -inch material is desirable so as to reduce the weight, which is a factor if the trap is to be moved. The use of bolts and the construction of the trap in five sections will facilitate dismantling.

The door or entrance through which pigeons are lured is the principal feature of a trap. Individual, free-swinging "bobs," as illustrated, are most practical and successful. The bobs can be made of heavy aluminum wire or lightweight metal rods. It is important that they swing upward and inward easily and drop back smoothly into slots at the base of the door. For sources of readymade trap doors, write for leaflet entitled, "Manufacturers of Bird Control Materials."



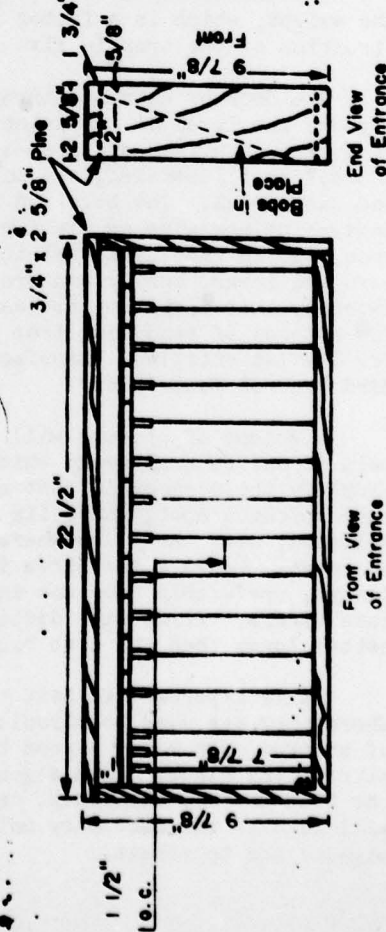
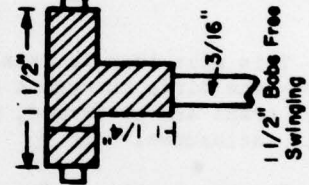
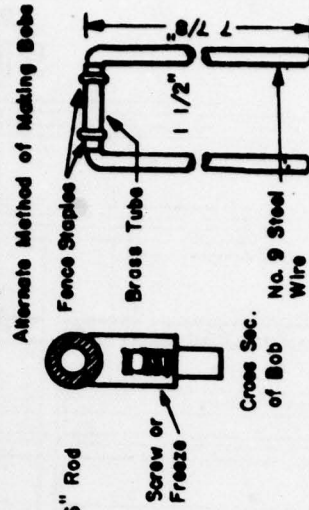
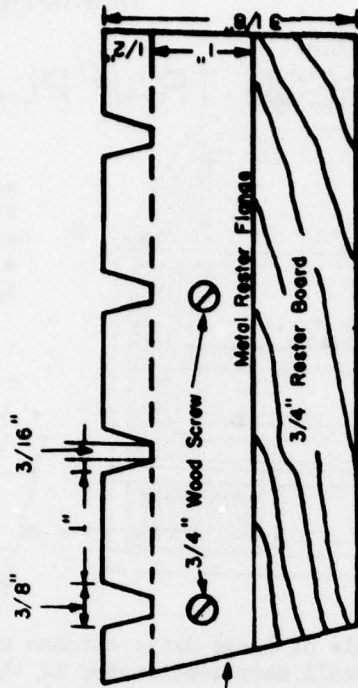
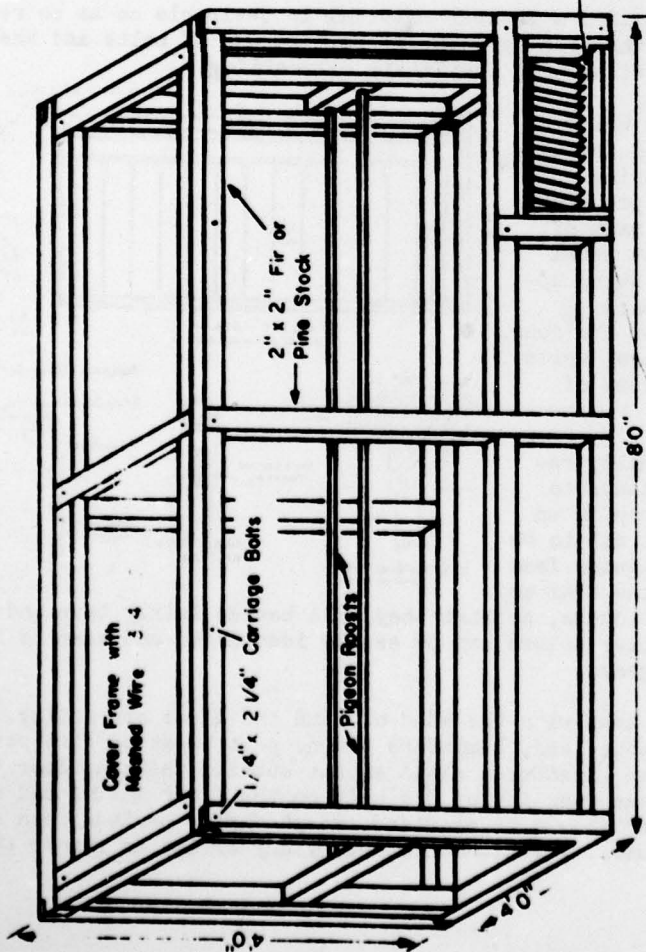
A colony of pigeons will usually remain in one general area, which tends to simplify their removal. Set a trap in an inconspicuous spot, where its not apt to be molested, near the place where pigeons feed or roost. Leave a few birds in the trap as decoys, preferably the same individuals, so that they will become fairly tame and thus lure others. Birds with distinctive colors can be easily identified and seem to be better lures than the drab blue-grays.

It is important to bait the trap with the kind of food the birds are eating. Where they are used to miscellaneous feed, a mixture of one part wheat to five parts of cracked corn makes a good bait. Scatter a small amount outside the trap door to attract the birds. Keep a generous quantity of the bait on the floor inside and near the trap door at all times. Water should be provided except during periods when snow will furnish the necessary moisture. Visit the trap every day or two to remove the pigeons and to rebait.





# PIGEON TRAP DESIGN





## APPENDIX I

### Foreign References for BASH Problems

#### KOREA:

Won, Pyong-OH  
Institute of Ornithology  
Kyung Hee University  
Seoul, Korea

#### JAPAN:

Ikhara Sadao                      Phone: 909-8834-1010  
Department of Biology  
University of Ryukyu  
Okinawa, Japan

#### PHILIPPINES:

Mr Pedro Gonsalves  
National Museum  
Old Congress Building  
Burzos Street  
Rizal Park  
Metro Manila

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WASH DC 20330			
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Cameron Station		Los Angeles CA 90090	
Alexandria VA 22314			
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		OH 45433	
AFPCB/MEIS	1	HQ AFLC/DEV	1
Forest Glen Section		Wright-Patterson AFB	
WRAMC		OH 45433	
WASH DC 20012		AFESC/PA	1
3700 Tech Tng Wing	1	Tyndall AFB FL 32403	
TTGIC/48 (Entomology)			
Sheppard AFB TX 76311		Federal Aviation	1
		Administration	
51 CSG/CC	1	MAS/300	
APO San Francisco 96570		Attn: Capt Harrison	
		800 Independence Ave	
51 CSG/DE	1	WASH DC 20591	
APO San Francisco 96570			
8 TFW/CC	1	51 CompW/SEF	2
APO San Francisco 96264		APO San Francisco 96570	
8 TFW/DE	1	8 TFW/CG	1
APO San Francisco 96264		APO San Francisco 96264	

8 TFW/SEF 2  
APO San Francisco 96264

3 TFW/DE 1  
APO San Francisco 96274

314 AD/CC 1  
APA San Francisco 96570

497 TFS/SEF 2  
APO San Francisco 96212

18 TFW/DE 1  
APO San Francisco 96239

5 AF/SEF 1  
APO San Francisco 96328

3 TFW/CC 1  
APO San Francisco 96274

3 TFW/SEF 2  
APO San Francisco 96374

314 AD/DOXF 2  
APO San Francisco 96570

18 TFW/CC 1  
APO San Francisco 96239

18 TFW/SEF 2  
APO San Francisco 96239